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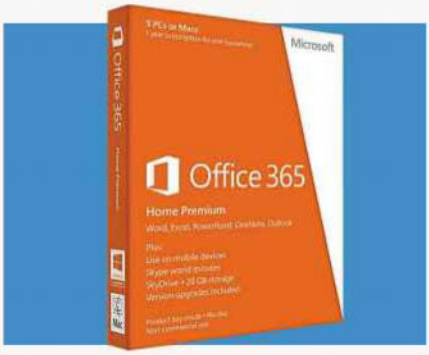

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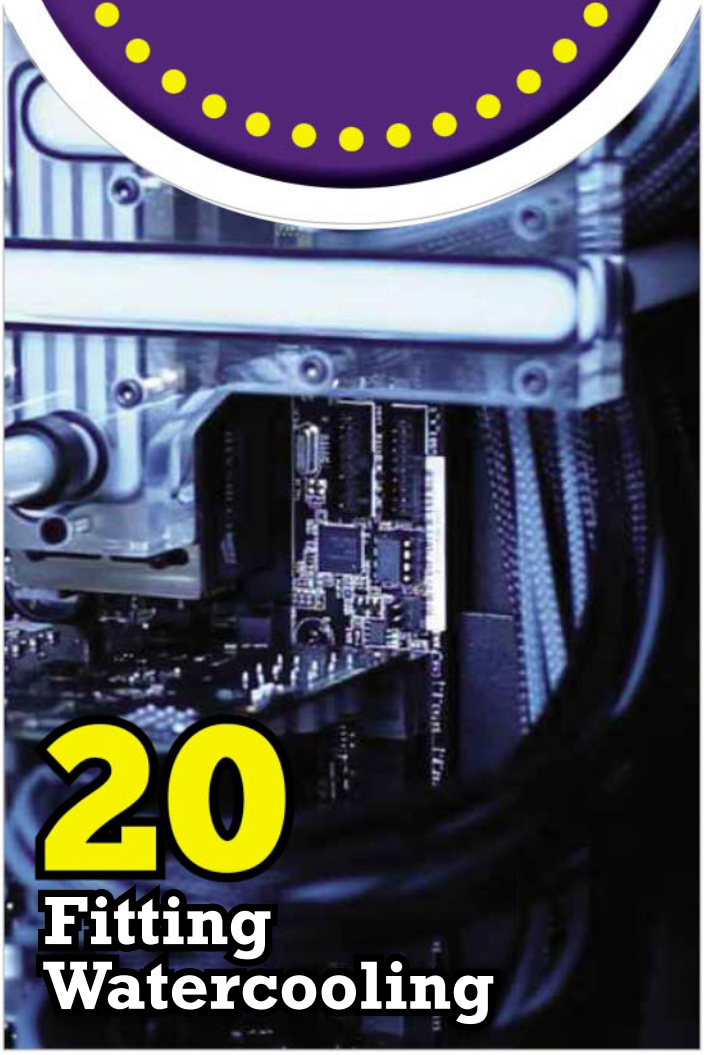

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60 Alternative Ink

Printer ink is expensive – we all know that. But do we realise just how expensive it really is? Stop to think about it, and the shock might well cause you to consider alternative solutions. Well, the good news is there are some far more affordable way to get your printing done, although they're not without their problems too…

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The BIG New Features Of Windows 10

With a new build released and a summer release date imminent, **David Crookes** looks at the latest delights that are set to be included in Windows 10

As the weeks begin to tick down, it becomes clear that the day of reckoning is coming. People are getting ready to cast their vote, and they're about to choose the candidate they feel is the best way forward for them for the foreseeable future. Most of them would agree that the outlook had looked good in 2009 when one of the major players had proved to be very strong, solid and approachable. Many of them will also feel frustrated that a change came that they didn't necessarily want and that the newcomer underperformed – its lacklustre performance and all too frequent U-turns making life rather confusing and difficult.

But that newcomer – Windows 8 – is on its way out. And in 2015, many wrongs look set to be put right. For this is the year when Windows 10 is going to be released, an operating system that promises to make life much clearer and easier. It will end, once and for all, the flip-flopping over the Start menu, which has so marred Windows 8 and 8.1, and it will, so the consensus suggests, be more of a return to the good old days of Windows 7. As for the other party, Apple, Microsoft hopes to pull clear. It has been very vocal about its achievements, it has tried to position itself as the people's OS developer, and it has even tried to push out fringe offerings such as Linux by opening its doors and inviting people in.

Indeed, the company has been making many promises and

> **"The first thing that was starkly noticeable was a different, neat look to the Start menu"**

Feeding Back

The development of Windows 10 is relying to a great extent on the Windows Insiders, a group of users who have volunteered through the Insider programme to test the operating system builds. At each step of the way, they feed back information about what works and what does not, and it helps Microsoft to get a good feel for how the final version will turn out. It should help to iron out bugs and avoid a good many of the various teething problems that a new operating system tends to have.

The programme was created to avoid the nightmare scenario that greeted the oft-panned Windows 8. Criticism of that OS was quick and the mud stuck. So more than ever, and with Linux, OS X, Android and iOS all vying for chunks of the market, it's imperative that Microsoft works its magic this time.

And while it's unlikely to start pointing the finger at those testers if there are any brickbats being thrown this time around, having people interested in road-testing Windows involved keeps them close to the project and helps to lower the opportunity for snark.

Indeed, Microsoft has done all it can to be accommodating to the testers, and with the latest build it has gone even further. It has enhanced the Windows Feedback app so feedback can be filtered and has made launching the app faster. It has also ensured that searching and submitting feedback has been improved, and it has updated the 'Your Progress' page so users can track the number of missions they have completed and see how often they have responded to feedback requests, how many feedbacks have been submitted and how many up-votes the feedback has attracted.

This approach to producing an operating system gives it a leg-up over Apple. It's not quite open source – there's no freely accessible code for anyone to just hack into, and everything is controlled and produced by Microsoft's workers – but it is tapping into the community.

With Microsoft's talent and a pooling of ideas, it's sure to create a winning OS. It's also great PR for Microsoft, which is not only showing that it listens to developers and respects ideas from outside its own four walls but is able to keep the promotional machine rolling on: every time a new build is produced, articles such as this are written to keep track. It maintains the spotlight for Windows 10, and it should mean the awareness and uptake of it will be raised as a result.

showcasing ever more features in order to encourage people to nail their crosses to its operating system. There is no doubt that it wants Windows 10 to be the operating system to overpower Apple's OS X and, to that end, it says it is actively listening to feedback in a bid to ensure the OS is the best it can possibly be. With a summer release pencilled in, the 'revolution' is closer than we envisaged. It's a bold plan, a new Microsoft in some respects, and something that we continue to watch very closely as each new build is released.

Make A Start

So what's new this time around? Well, at the end of March, Microsoft released the latest build of the Windows 10 Technical preview to anyone signed up to the Windows Insider program. And the first thing that was starkly noticeable was a different, neat look to the Start menu which, as all Microsoft users know, was initially dropped from Windows 8 only to be resurrected, much to everyone's joy.

Last September, the Start menu of Windows 10 showed how it would merge the interface and live tiles of Windows 7 and 8 to offer a modern look to the new OS. But we can now see that the Start menu is set to boast a transparent background, which allows the desktop to shine through and gives prominence to the menu icons and tiles. It's not a fundamental change to the way the OS works, but it sure looks neat.

At the same time, the All Apps button has also been made more user-friendly. As well as being accessible via a finger-touch, it's possible to manipulate the All Apps list to best suit your needs. You can pin apps from the list to Start as well as drag and drop them to a most-used list. It is one of the many features that the development community surrounding Windows 10 had asked for and, according to Microsoft, it was one of the top requests.

Virtual Desktops

The biggest request, though, was for improvements to be made to the Virtual Desktops. The Virtual Desktops are nothing new, of course, but they are now a firmly mainstream Windows 10 feature, which allows for dozens upon dozens of virtual desktops to be created via the Task View pane. The only problem with the Virtual Desktops as it stood was that the feature had many limitations that upset many testers. The latest build makes a good attempt at widening the scope, however.

> **"Cortana will make good use of your network"**

According to Microsoft, its Windows Insiders (the volunteers testing Windows 10 builds) wanted to make it easier to move between the desktops. They asked for Windows 10 to allow them to simply drag a window to a Virtual Desktop as opposed to the clumsier method of right-clicking and using a context menu. The change has made a huge difference, and it gets around the problem of having multiple screens of apps on a single monitor that are hard to move between. It will reduce clutter and make for a more fluid computer experience for users too.

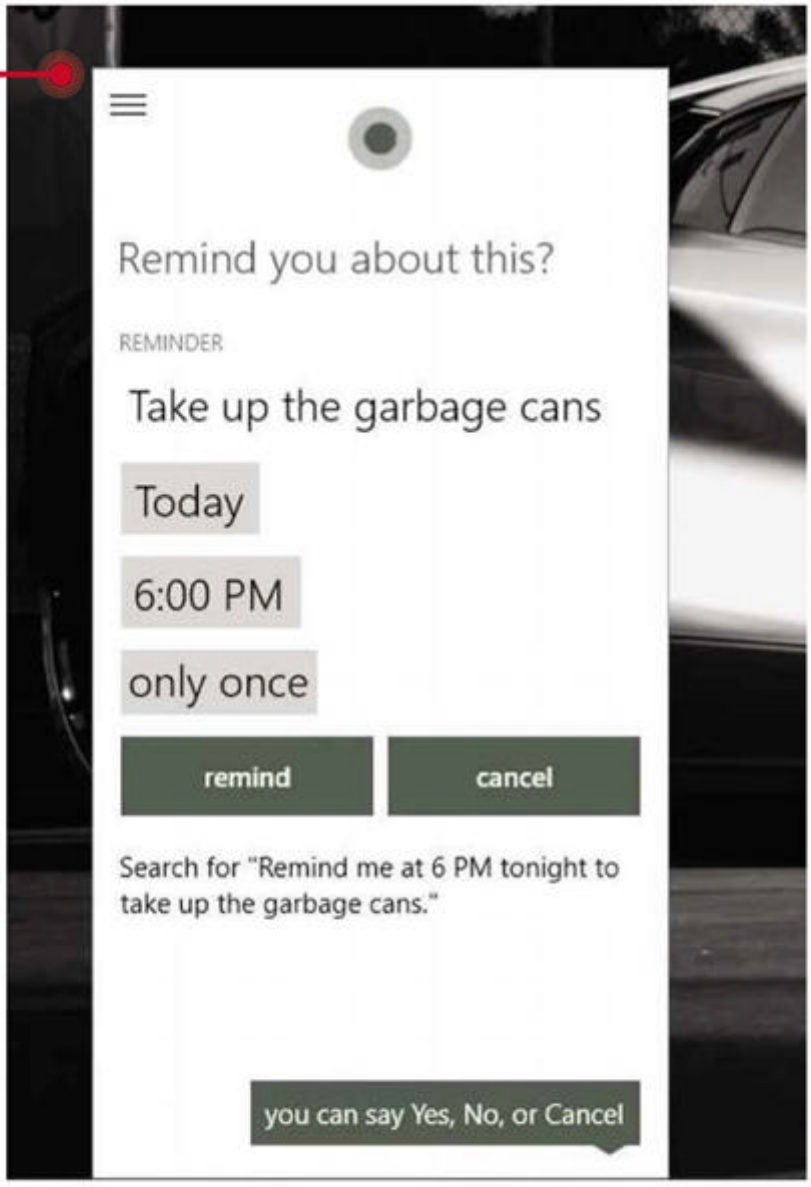
What's more, the new build – which, incidentally is entitled 10041 – also lets users drag windows to the '+' icon, which not only creates a fresh virtual desktop but inserts the window into it. Microsoft has declared that it still wants to do more work with Virtual Desktops to make it a killer feature of the new OS, a move that will surely appease all those who want to see this feature exploited to its full potential.

One way it's already doing this is by sensibly supporting a filtered taskbar so only the tasks set up in a particular Virtual Desktop will show. Microsoft says it's "doing some A/B testing" in this area so that it can decide on the best defaults to offer. Windows 10 is also offering a filtered Alt+Tab, which the company says will allow users to only see the windows on a given Virtual Desktop. This is an area we'll be keeping a close eye on over the coming months.

Cor... More Cortana

We'll also be keenly looking to see how Cortana develops within Windows 10. Earlier in the year, we saw Joe Belfiore, the corporate vice president of the Operating Systems Group at Microsoft, showing off Windows 10's integration of Cortana, the digital voice assistant which had, up to that point, been confined to Windows Phones. We saw how Cortana's ability to learn the interests of users and present relevant information was set to make an impact in the world of digital personal assistants while making it even easy to search for items on Bing, the computer and a OneDrive account. We also saw that it would support seven languages and impersonate Yoda (!) and that it would be built into a new web browser intended to end Internet Explorer's 20-year run called Spartan.

With build 10041, Microsoft has announced that Cortana support would expand to China,



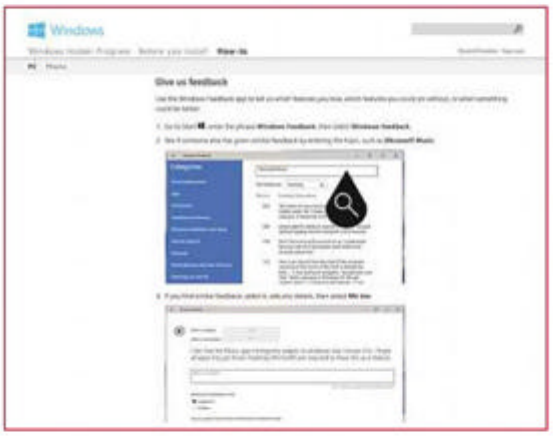
Get Involved

Are you a developer and do you want to get involved and check out the latest build? Then this is how you can get started with Windows 10.

1 You will need to sign up for the Windows Insider Programme by going to **insider.windows.com**. All you need is a Microsoft account. Simply read the Participation Agreement and the Privacy Statement, select your area of interest from the four options (apps or games for PCs, tablets and phones; apps for Microsoft HoloLens or company use) and then tick to accept to continue.

2 You will now be able to install the latest Windows 10 Technical Preview – in this case 10041. There is also the option of downloading and installing the Preview for phones. It's possible to install the software on multiple devices.

3 If you want to start creating an app, then you can use the universal app templates that are located under the <Language> | Windows 10 node. You can also click on How-to to view new updates, give feedback and choose how often you get a new build. The more frequent the updates, the more likely the operating system will have bugs.



4 There are other tools you can use to develop Windows Universal apps, including Visual Studio Tools for Windows 10 Technical Preview. You should also bear in mind that you need to back up everything before you install the new OS. It's not stable, and it could crash or even delete your files.

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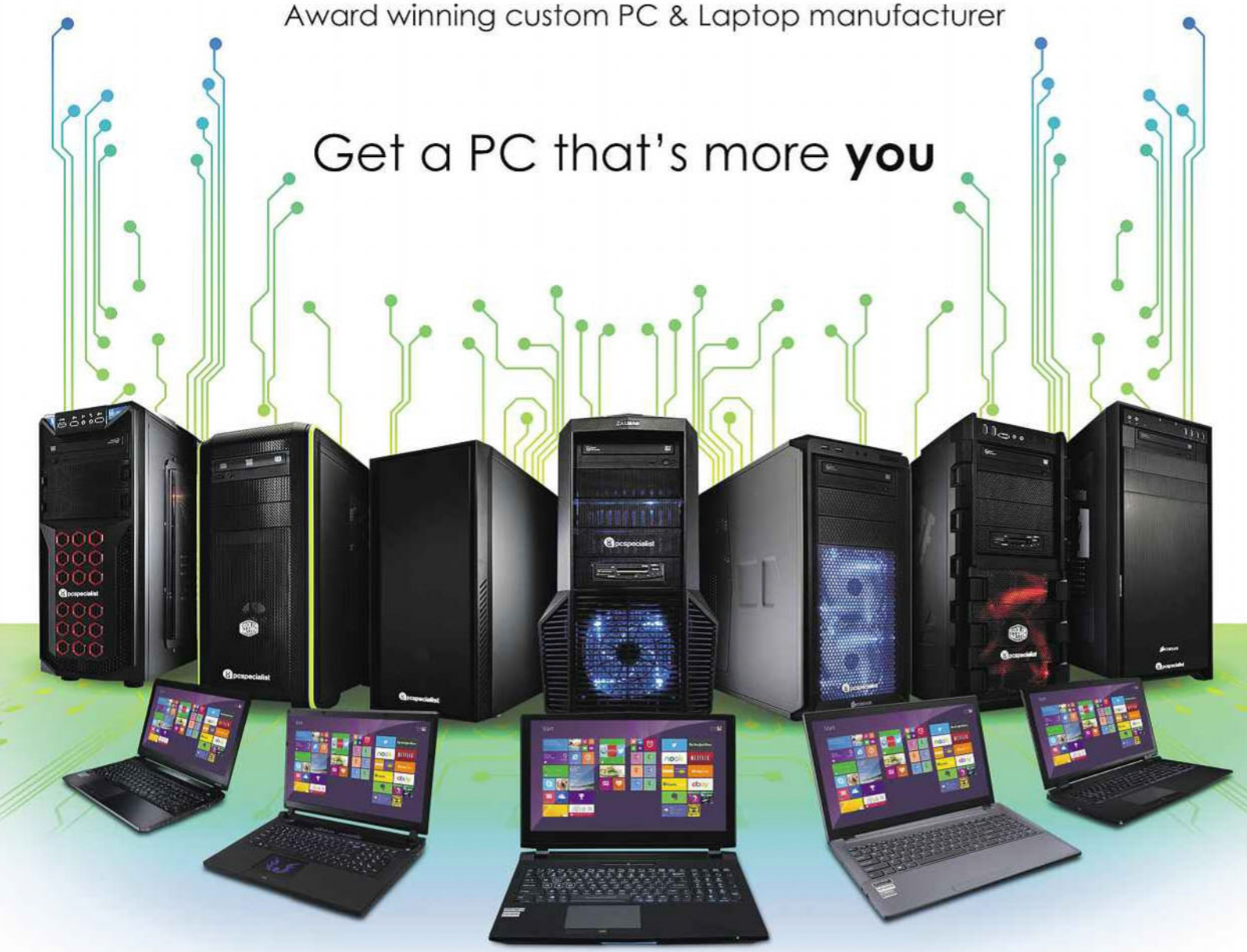

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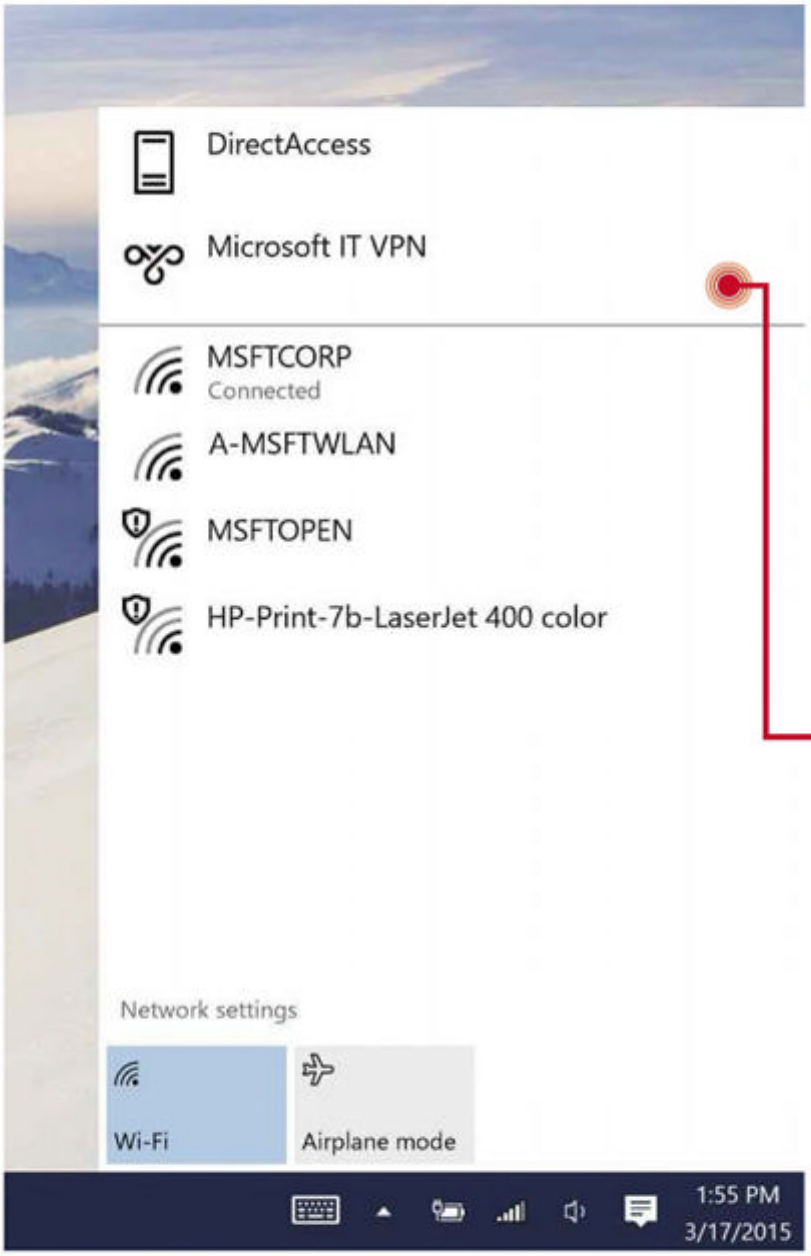

This Is Spartan

Okay, that headline that has been used a thousand times to describe the new browser on the block, codenamed Project Spartan, but we're making use of it because it would seem that Spartan really has muscled Internet Explorer off the scene.

Microsoft confirmed IE will be no more except for enterprise purposes on some Windows 10 versions. Spartan will be the new default browser instead. Not that Spartan is likely to be the actual name. "We have to name the thing," marketing chief Chris Capossela told the Microsoft Convergence event.

the UK, France, Germany, Italy and Spain. It has also said that it will continue to fix bugs and add new capabilities although, for the moment at least, nothing extra has been implemented. For those who don't want it, it can be turned off, with some users complaining that searches in Windows 10 automatically query Cortana as well as the web. As far as Microsoft is concerned, though, Cortana is a necessity given the inroads made by Apple's Siri and Google Now, especially given the latter announced it will open up Now's API to developers, allowing them to create interactive cards.

So far, it would appear that Cortana isn't as fully fledged as people would perhaps like (it cannot launch apps as of yet, and it tends to deliver web results in a browser rather than give a direct answer or carry out a specific action. But it is customisable, and privacy is seemingly important, with users able to dictate what it does and doesn't know about them (it makes good use of the Notebook, in which you're able to list what you like and give a flavour of your day-to-day dealings).

Cortana doesn't rely solely on voice commands either: it will respond to typed suggestions, and it will serve up a daily diet of news and sports items that are based on your interests. It will even be able to crack a joke or two.

(Incidentally, it seems that Cortana on mobile devices is being given the capability to track packages that have been purchased online. The aim is to create a hub for package delivery information, but this doesn't seem to be making its way to desktops... yet!)

Network Access

Cortana will make good use of your network such as being able to find music on any your Windows devices. Networking will, as expected, be a core function of Windows 10. Microsoft is keen to make it easier to set up and maintain networks, and its new Windows 10 build has a fly-out menu that lists every wi-fi network in your vicinity and lists the wireless settings.

> **"The Start menu is set to boast a transparent background"**

There's still much work to do with this function, but being able to manage networks and switch between them with minimum fuss is something to applaud, making it much easier to connect a Windows 10 computer. It's also more than a match for Apple's easy-access network function within OS X, and it shows that Microsoft is aiming for an operating system that 'just works'.

Better Photos

Microsoft is looking to extend that ease-of-use, no-fuss philosophy to the new Photos app that is heading our way in Windows 10. The previous Windows 10 build showed

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an app that would allow users to clean up images, remove duplicates and auto-enhance while supporting image sharing. It also showed that photos would be synced to the cloud. Now Microsoft says the updated Live Tile for the Photos app will include any images saved in OneDrive, expanding on the previous situation of only showing photographs that are saved on the actual computer.

Again, while this is really only aesthetic, Microsoft has been carrying out much work 'under-the-hood'. It has boosted the Photo app's performance and reliability but, more interestingly, it has tweaked the package to allow people to use a camera's RAW format files, a move that will surely please the keenest of photographers among us.

This gives users of the app the ability to use the very best digital image output, since RAW files are akin to undeveloped film that have not been processed into formats such as JPEG. All of the image data that is recorded by a camera's sensor is captured in a RAW file, but the main problem with saving in this format is that it can't be opened normally on a computer unless a special package is installed. The Photos app will make life much more simple, giving 'out-of-the-box' support. Even better, Microsoft says that the Photos app will be up to date with most of the new cameras on the market.

On top of that, Microsoft has included a small number of shortcuts for the Photos app that concern the tab, arrow keys and the page up/down, and it says that it intends to add more "for the most popular actions/workflows".

New Text Input

Microsoft also wants to make it easier to input data into Windows 10. For those using tablets and touch-screen devices such as the Surface Pro 3, Windows 10 has

"Microsoft also wants to make it easier to input data into Windows 10"

a new handwriting input canvas that is especially geared towards short text entry. It's better able to recognise handwriting, and it allows for edit control using a pen.

The edit options will be displayed nearby and be easily accessible with a tap of a pen. They will include the ability to delete words, return and select a different keyboard. Suggestions and next word predictions (similar to those found on a smartphone keyboard) will be automatically shown, and it will even be possible to toggle to the Windows 8 handwriting canvas, should you prefer it. All in all, it's a neat feature that we're sure will also be enhanced further.

Lock It Up

Of course, all of this will make Windows 10 an intricate beast. With more features and many little nuggets to discover, it's fair to say that it's shaping up into a useful, solid and considered operating system. At the same time, though, it could prove to be difficult for some to get their heads around. Microsoft is already seeing a great many people trying to adapt to life after Windows XP, and while they're just getting used to Windows 7, 8 or 8.1, it could be that they will struggle once more with Windows 10.

For that reason, Microsoft has been keenly looking at making the most of Windows 10's lock screen. It recognises that a new

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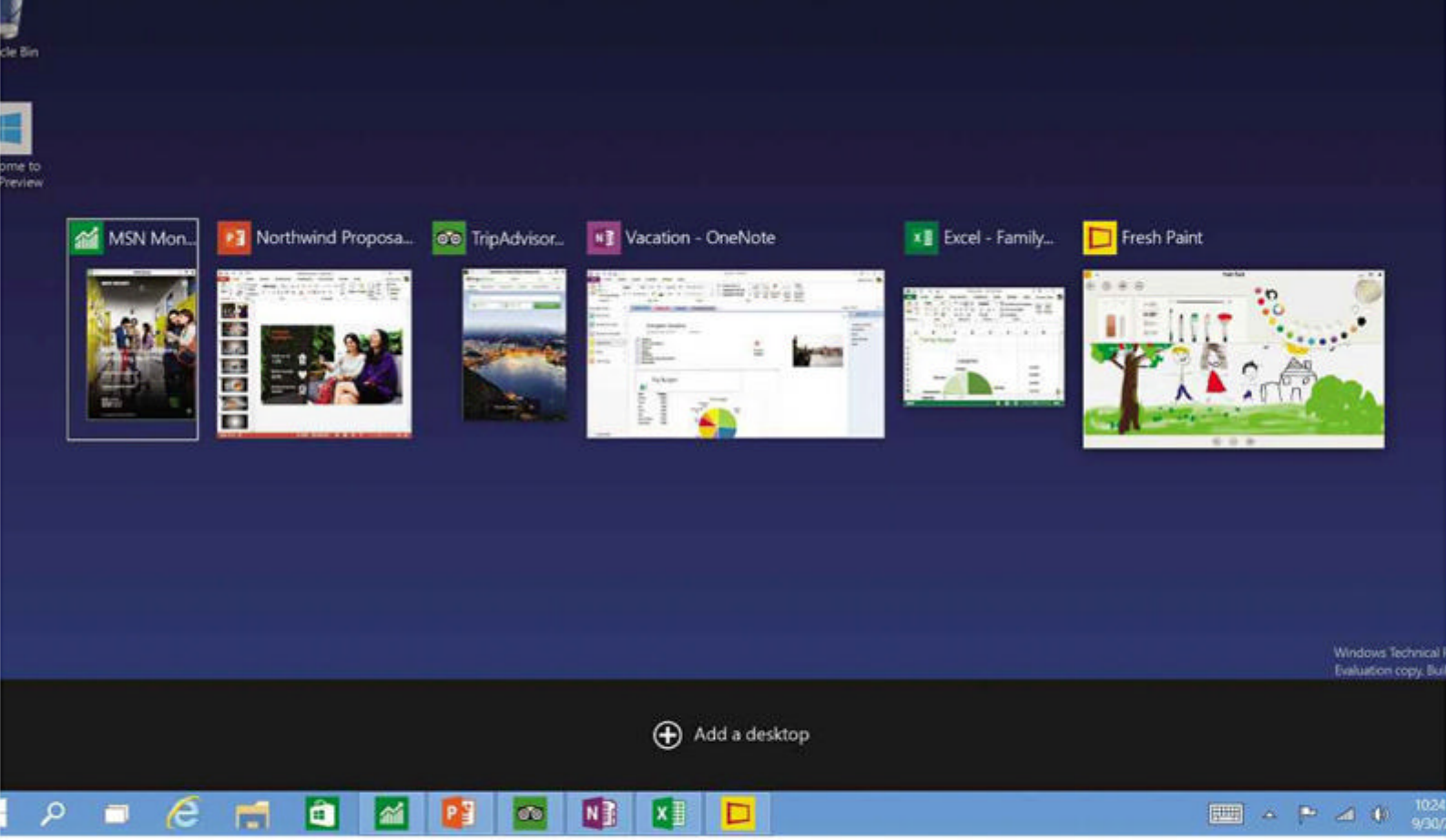

operating system release will lead to a noticeable learning curve and that there will be some who feel they are stepping back, daunted at the new interface (even something as simple as a switch from iOS 6 to iOS 7 caused a major fuss). So it wants to create a virtual noticeboard of sorts by positioning tips, tricks and hints on the lock screen that will sit alongside some nice imagery.

This will prove to be educational for users and hopefully get them to grips with the operating system. For those who feel they've grasped everything or don't care, there will be a way of turning off the hints, and it will also be possible for users to change the lock screen background from one of the many rotating, Microsoft-provided images with a lovely photo of their own.

As well as the lock screen, there's a redesigned login screen, although it's a fair bet that this will be altered as the weeks tick away. With much experimentation, this is mainly a case of Microsoft finding a look that it is keen on pushing out to a mainstream audience, and it will have user-friendliness and simplicity in mind to ensure that the experience is welcoming from the very start. This will be the thinking behind the flat icons that are now part and parcel of Windows 10, unashamedly following a trend set by Apple during its redesign of iOS 7 and of the latest OS X, Yosemite. It will also be the thinking behind boosting consumer-friendly features such as Photos and Cortana.

"The biggest request was for improvements to be made to the Virtual Desktops"

Looking Forward

All of this makes us very excited about the future of Windows 10 which, like Windows 7 and Windows XP, looks set to be a success. It is vital that Microsoft gets it right given that the take-up is likely to be on OS X levels thanks to the operating system being free. The fact that the free offer is limited to one year will also hasten the number of upgrades, and it also means Microsoft must ensure the OS is as bug free and usable as possible. Given the current showing, we'd be happy to give it our vote when it's released in the summer. We only hope its promise is fulfilled. **mm**

Free For All?

We all know that Windows 10 will be a free upgrade for anyone who owns Windows 7 and Windows 8. But what we didn't know was that even those with pirated copies of Microsoft's OSs will also be able to benefit. According to Microsoft's executive vice president of operating systems, Terry Myerson, Microsoft will be "upgrading all qualified PCs, genuine and non-genuine, to Windows 10."

Microsoft seemed to confirm that in a statement that read, "Anyone with a qualified device can upgrade to Windows 10, including those with pirated copies of Windows. We believe customers over time will realise the value of properly licensing Windows and we will make it easy for them to move to legitimate copies."

Yet, in a statement to the technology website Ars Technica, Microsoft clarified the situation. It would appear that, yes, it will be possible to upgrade a pirated copy of Windows 7 or 8, but it will not mean that the licence is genuine. "With Windows 10, although non-Genuine PCs may be able to upgrade to Windows 10, the upgrade will not change the genuine state of the licence," the statement read. "If a device was considered non-genuine or mislicensed prior to the upgrade, that device will continue to be considered non-genuine or mislicensed after the upgrade."

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Step By Step:

Fitting A Liquid Cooling Kit

Upgrading your cooling solution isn't hard at all, as we demonstrate here

Liquid cooling for a PC has come on in leaps and bounds over the last five years or so. Where once we had unwieldy, over-large solutions that – more often than not – didn't work as well as they were advertised, needed regular topping up and nigh-on constant maintenance, everything now can be found in a single, very neat, kit.

The advantages of liquid cooling, are many. You don't have to be an avid overclocker or someone who owns a system so immensely powerful that Sizewell B needs to dip a few rods of uranium into the tank to help turn it on. Liquid cooling keeps a system quiet, stable and helps keep the lifespan of components as high as possible. From the point of view of someone who does fancy dabbling in overclocking, a liquid cooled system can be pushed much further than that of a traditionally air cooled one, while still keeping the entire system as quiet as possible. The improved computing power from an overclocked and liquid cooled system makes quite a difference, and there's little doubt the benchmarks scores will soar once you start upping the GHz. Plus, there's the advantage of being able to fit more powerful components.

As we said, fitting a liquid cooling solution isn't too difficult these days. To help guide through the steps, though, we were kindly lent a Corsair H55 High Performance CPU Liquid Cooler by Falcon Computers (as found at **www.falconcomputers.co.uk/corsair/h55-high-performance-cpu-liquid-cooler.html**).

This is an exceptionally compact unit that still manages to deliver superior CPU cooling through the combination of the 120mm fan, aluminium heat exchange radiator and micro-fin copper plate pump head. It's also zero maintenance, completely self-contained and compatible with both Intel and AMD processors.

Step 1

If, like our test system, there's already a cooling solution in place, remove it and unpack the H55. Inside the package you'll find mounting plates and socket screws for both Intel and AMD setups, as well as a retention ring, backplate, pump, radiator and the 120mm fan – along with the sundry pins and clips needed to finish the job.

Step 2

Locate the correct retention ring for the type of motherboard socket you have – ours was a a socket Intel LGA 1155 Core i5 – and push the four clips into place on the outer arms of the ring, followed by the locking clips to hold it on the underside.

Depending on the type of socket you're working with, you'll have to either point the clips inward – as we have, look to the larger oval-shaped section – or toward the front. As a point of note: here, we found that the H55 instructions said to point the clips inward for LGA 1366/2011 and the opposite for LGA 1150 and so on, but in our case with the LGA 1155 board the clips needed to point inward, as per the image you can see to the right.

If you look carefully on the locking clips on the underside you'll notice the socket type was been imprinted on to the outer edge so you can't get mixed up.

Things To Look Out For

Fitting any non-stock cooler, regardless of whether it's liquid or air cooled, is bound to bring up one or two issues along the way. We've fitted countless coolers in our time, and it's not often you get one that goes in the first time without a bit of jigging around of the memory, moving a handful of cables out of the way or having to refit a drive lower down in the chassis. No doubt you've come across many other niggles as well.

A few hiccups with the fitting of a liquid cooler appear mainly to be centred around the backplate, where there's a rouge capacitor in the way, or the holes don't match up for whatever reason. Usually this only occurs on older motherboards, but one or two modern examples may crop up from time to time.

Another problem we've seen is a lack of clearance at the back of the chassis for a large 120mm fan. If you don't think yours will fit a bigger fan, then you could always opt for one of the liquid coolers with a smaller fan – see the other boxout.

Finally, the last issue is usually down to an overzealous hand on the screwdriver. Turning the screwdriver until you hear a faint crack isn't really advisable, believe us we've come across that thinking before and it rarely results in a happy system builder.

Most issues can be overcome with a little ingenuity and some forward planning. If you're not sure what your motherboard and chassis can take, in terms of a liquid cooler kit, then call up the place you're buying it from and ask.

STEP BY STEP: LIQUID COOLING

First, check you have everything in place and that your board and case can take the new cooler

The best part is opening the box of goodies

Check you have the right retention ring for the right motherboard socket

STEP 3 The next step, once you've pushed the clips on the outer arms of the retention ring together, is to locate the appropriate CPU screws and push them through the clips in the retention ring until they click into place.

For the record: the longer screws are for LGA 1150/1155/1156 and the shorter for LGA 2011 (you can see the difference in the image, though it's subtle). Once clicked in, these screws will be held in place and secure enough that they won't fall out when you lift the ring.

STEP 4 Put the retention ring to one side for the time being, and find the backplate designed for your processor. In our case, we noticed the Intel backplate was the one with the multiple pin indentations in the corners; whereas the AMD version has just a single pin indentation in each corner.

From the three available indents, pick the one that's designed for your socket type, and push the small oval-shaped pins through the top of the backplate until they fit into the indent.

STEP 5 This, we're please to say, is a fairly easy bit – although it's all been fairly easy so far, hasn't it? Find the sticky, rubber spacer and remove the backing on both sides. Once that's done, In the

Pop the clips on to the outer arms of the retention ring

Make sure you also have the right CPU screws for the type of socket

The screws just push through the clips and snap into place

With everything snapped into place, the retention ring with screwed will be secure

The backplate, again, needs to be right one for the type of socket motherboard you have

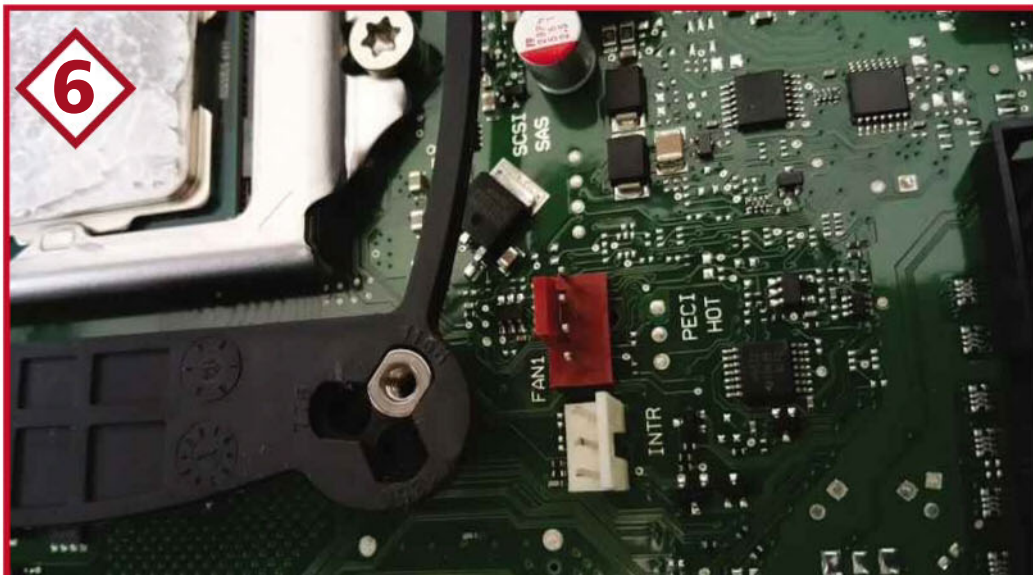
allocated grooved sections of the underside of the backplate, stick the pads to either sides.

STEP 6 Take the backplate and fit it to the screw mounts located around the CPU socket. In our case we needed to remove some old brass mounts beforehand, just make sure you do remove everything behind the board or this isn't going to work.

Look close enough and you'll see the socket number on the backplate

Flip the backplate and apply the sticky rubber spacers

Fit the backplate to the motherboard, watch out for rouge capacitors



Other Liquid Coolers Options

Since Falcon Computers was kind enough to let us loose with one of its cooling kits, we thought we'd mention a few of the other liquid coolers it has on offer.

Coolermaster Nepton 140XL
An impressive cooler for both Intel and AMD sockets, with long flexible tubes. (**goo.gl/Q8EdDL**)

Corsair H100i
A dual fan liquid cooler for performance systems and those who fancy taking overclocking to a higher degree. (**goo.gl/FqERHK**)

Coolermaster Seidon 120v
An excellent liquid cooling solution for just £40, complete with a 120mm fan. (**goo.gl/dZ3tTo**)

NZXT Kraken G10 GPU Cooler
An impressive graphics card cooler with adapter for fitting to a wide range of Nvidia and AMD cards. (**goo.gl/W0AlSL**)

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STEP 7

The next step is fitting the assembled retention ring to the pump head, with the retention clip that's among the included parts. Work the pump head through the retention ring so that it fits over the top and the pump and lines up with the notches around the pump head. Then take the retention clip and push it into place under the pump head so it snaps in together with the retention ring.

▲ *Slide the retention ring up through the notches in the pump head*

▲➤ *Line up the retention ring with the pump head, into the notches*

➤ *The retention clip can then be pushed up and clicked into place around the pump head*

STEP 8

Check you have enough clearance at the rear of the case to fit the 120mm fan and radiator, with the hoses at the bottom of the unit. There are a couple of ways of fitting the fan and radiator. The more common and mostly recommended route is to fit the fan as an air intake against the radiator. But it all depends on how you've setup your system. In our case, we'll stick to the recommended option.

➤ *Place the fan against the radiator so that it's lined up for air intake, then fit it to the chassis with the screws provided*

STEP 9

With the pump head now assembled and the fan and radiator fixed to the inner chassis of the case, place the retention ring socket screws over the backplate you fitted to the motherboard earlier and start to gently tighten each opposite screw in turn. Whatever you do, don't over-tighten, just make sure there's no movement and that good contact is made between the copper plate and CPU. There's no need to apply any more thermal paste, either; there's some already on the copper plate of the pump head. You can add a little to the CPU if you so wish, though.

Finally, plug the fan and pump power in to the available three and fort point headers on the motherboard, and you're good to go.

➤ *With everything in place, screw the pump head onto the backplate, but make sure you don't overtighten*

Conclusion

If all went to plan (and it's always a blessing when it does in computing), you should now have a low-noise, superb liquid cooling system gently humming away and keeping your overworked CPU within tolerable limits.

The advantages of liquid cooling are many, and as we proved here fitting one isn't as much of the chore it once was, or it always first appears to be. Basically put, if we can do it, then most other computer enthusiasts shouldn't have any problem either. **mm**

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Microsoft Garage

David Briddock discovers where Microsoft employees build their crazy ideas

Under the leadership of Satya Nadella Microsoft is undergoing radical cultural change.

Since Nadella but took over the CEO position from Steve Ballmer there have been many well publicised indications of internal change, and one place in particular showcases the company's new way of working.

This place is called is the Microsoft Garage.

Background

Founded in 2009 within the Office Labs group, Microsoft Garage acts as a hub for grassroots innovation at Microsoft, a safe place for Microsoft employees to build their crazy ideas. Consequently, it has an entrepreneurial spirit, as opposed to the more academic focus of the Microsoft Research teams.

A free-thinking, hands-on approach has helped grow the Garage into a community of more than 10,000 Microsoft employees, who operate in 36 Garage chapters spread around the world. This community involvement extends to hackathons, science fairs, and general maker-style tinkering.

The wide diversity of Microsoft Garage projects help connect people and dissolve the traditional boundaries of geographies, organisations and disciplines.

Opening Up

Until recently the Garage was a Microsoft-only domain, but that started to change when the forward-thinking Nadella began his extensive internal reorganisation.

When it came to Garage projects, Nadella wanted to the public to get involved too, so now we can all download and evaluate for ourselves whatever wild projects the Garage members have dreamt up.

Nadella realised that by opening up Garage to the public Microsoft would discover how we respond to all these apps. This feedback will come in two forms: explicit feedback from sources like social channels and app reviews, and implicit feedback from actual app usage – each app is internally instrumented.

Feedback pattern analysis helps Microsoft figure out what works and what doesn't. For example, if it finds a high proportion of users are struggling to find a particular feature, it could re-engineer the app's interface.

And if you're not a Microsoft Windows user, you needn't feel left out. Garage members are keen to support a range of alternative platforms, so in addition to Windows and Windows Phone apps, there are also projects for Xbox One, Google Android and Apple iOS – as we'll see later.

Buzzy Environment

Jeff Ramos, Microsoft's manager of the Garage, doesn't really have much of a recruitment problem. The buzzy, innovative nature of the Garage environment has proved attractive to so many Microsoft employees.

As technology architect Sam Trim says, "There are so many creative people here from all walks of life, and a wide distribution of talent."

And the infectious sense of community spirit was expressed by senior program

manager Ed Essey when he said, "Great ideas are easy. The magic happens where execution meets data. The Garage focuses on connecting people with diverse perspectives to quickly bring an idea to life, share it and learn from that experience."

Microsoft developers Milind Solage and Soniya Khoja, who created the DevSpace app, put it more simply when they say, "The Garage converts ideas into realities."

And there really are no rules. Some projects like the 'Forgotten Attachment Detector' for Microsoft Outlook end up being incorporated into production code, but others, like Mount Maker – a massive sheet metal volcano parked in the middle of the room that erupts helium balloons by remote control – are simply fun-filled flights of imagination.

Such is the attraction of the Microsoft Garage environment that even on a weeknight it's chock full of people: hackers, makers, artists, tinkerers, musicians and inventors – each one grafting away on projects at various stages of evolution. In many ways it's a scene reminiscent of the dawn of the personal computing age when hackers (including Bill Gates himself) regularly coded through the night, for fun and for profit.

You can read more enlightening and personal stories on the Microsoft Garage Story web page (see Links boxout).

And the Garage isn't just about software. There's also the Garage Maker space. Here you'll find a comprehensively stocked workshop area for hardware hacking, complete with workbenches, hand tools, design tools, laser cutters, 3D printing technology, soldering stations plus electronic circuit boards and components.

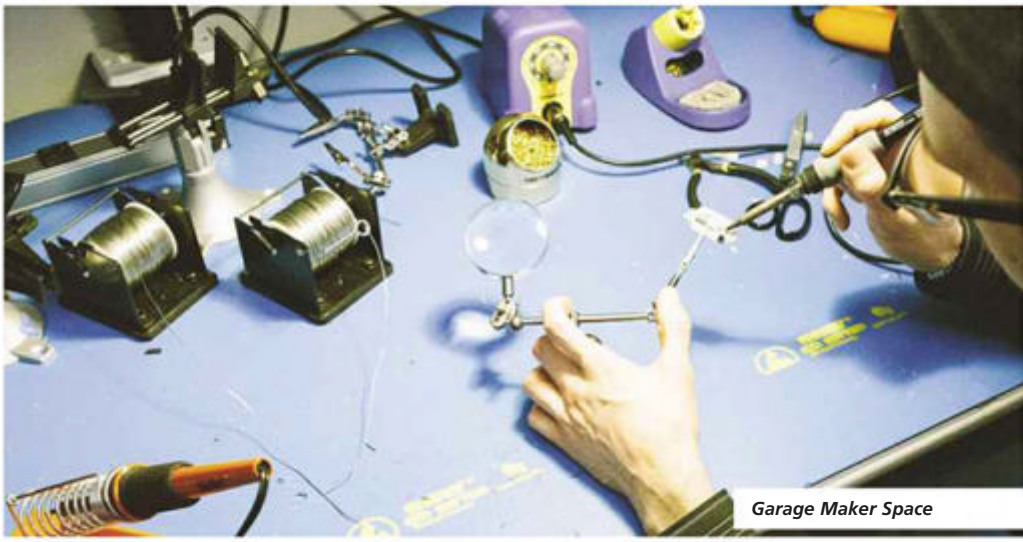
First Wave Of Incubation Apps

October 2014 saw the initial wave of incubation app launches.

Mouse Without Borders was one of the original Garage projects. Once installed you can control up to four Windows computers from a single mouse and keyboard setup.

The Developer Assistant app is aimed at the coding community. It provides a guide and simple way to find and reuse millions of code snippets and sample projects from within the Visual Studio environment.

This first launch wave also included some Android apps. Picturesque Lock Screen brings Bing home page images to an Android lock screen, but that's not all. You can also see missed calls or text messages, today's weather, news headlines, regional calendars and even initiate a web search.



Garage Maker Space

"Microsoft Garage acts as a hub for grassroots innovation at Microsoft"

Another popular Android download is the Torque app. Here the device's built-in accelerometer is used to turn a particular motion into a specific action – for example, to voice search the web, make a phone call, text a friend, launch an app or take dictation notes.

Latest App Wave

The latest versions of all the above apps are available on the recently revamped Garage website's Workbench page (see Links boxout).

In February 2015 a new wave of projects appeared on this website. Some are already available to download from the respective app stores, depending on the target platform, while the others should be downloadable soon. Below is a little taster of what's on offer, split into various categories.

Productivity Apps

The simple but clever Keyboard for Excel app replaces your Android keyboard with a layout optimised for Excel.

Tetra Lockscreen is a lock screen app for Windows Phones to help owners customise the notification experience. Individual widgets are available for agendas, current location, stopwatch and activity tracking.

Meanwhile the Android lock screen app Next Lock Screen saves you time by only displaying information and apps relevant to your location and current activity. Elements include calendar, missed calls, emails, text messages, a calendar and single swipe call initiation – all without unlocking your phone.

For those who make frequent conference calls, Join Conference is a great time-saver. Launch the app using the big join button at the top of your current meeting appointment or issue the voice command 'Join Conference' to Cortana. The app parses the meeting invite text to discover the conference system type, meeting ID and PIN codes and whether you're the meeting leader. Then it figures out the best way to connect to the meeting – say, either launching an app like Lync or GoToMeeting or by dialling the phone number and ID/PIN touch tones.

Student Planner is a Windows tool that takes course and planning documents, extracts the key information for you, then adds events to your Outlook calendar events/notifications, creates OneNote pages for classes and finally stores the documents on your OneDrive.

Team-based productivity is also addressed. With Collaborate for Windows and Windows Phone, you host or join a virtual canvases session made up of text cards and images. Everyone can write/draw on the canvas then reorganise the text and image content using pinch, drag and rotate gestures.

The Floatz for Windows Phone app, meanwhile, lets you float your idea to discover what the people think about it or join in an existing conversation.

Info Apps

The Apple iOS app Snipp3t gathers the latest celebrity news, to quickly browse the headlines while also providing a 'subscribe to famous people' option.

Developed for Android Wear, the Torque app removes the need to say 'OK Google'

Satya Nadella

to ask your smartwatch a question by voice input. Instead you simply lift your arm, twist your wrist and ask Bing your question.

For Chinese-speaking Windows Phone owners, the Your Weather offers personalised air quality and weather reports for cities across China. Working closely with Microsoft Research Asia and the ChinaMeteorological Administration, the team managed to incorporate Azure data and Machine Learning algorithms into Live Tiles and the Lock Screen. It even has an artistic aspect through the use of Chinese paintings within the interactive reports.

Social Apps

There are a number of social focus apps too. SquadWatch for Windows Phone is one example. It displays real-time information on the whereabouts of your friends and loved ones, so you'll see if, say, they're stuck in a meeting or already on their way home, without having to text or call.

Journeys & Notes is another social app, this time for Android (with iOS and Windows Phone expected soon). Here you'll connect to a community of people who share journey information, and you can leave notes for others to discover, whether it's just a bus ride to work or global jet-setting.

Reach Me lets Windows Phone owners share your location and provide turn-by-turn directions. You can guide friends to your location in real time, with easy-to-follow updates as you move from place to place. Location tracking expires at the time you set, so you control how long they are able to follow.

Facebook users might like AutoTag 'n Search My Photos. This Windows 8.1 app uses your Facebook tagged photos to help you tag your own personal pictures. The software learns your friends' faces (accuracy improves the more you use the app), then it automatically tags photos stored in your Pictures Library on Windows. If you include OneDrive photos in the Pictures library and photos taken on a Windows Phone, they can also be automatically tagged and so instantly become searchable.

Games

Gamers aren't left out of the fun either. The Xbox One RTS space shooter game *Voice Commander* accepts voice commands and input from up to eight game controllers to defeat the attackers.

Windows Phone owners can download Nova Bacon where, as an alien armed with a gigantic claw, you must travel to Earth and fetch an Earth-bound pig while fending off humans.

And in *Lost Turtle*, available for Windows and Windows Phone, players help Walter the turtle find his watery home by controlling his jetpack thrusters to navigate through mountains and volcanos.

Not quite gaming, but definitely fun, the Sound Stack music creation tool for Windows Phone aims to cater to musicians at every level, from beginner to expert. Tap to play the virtual drums, press and slide over the synth pad to create masterful melodies or even use your camera-captured surroundings to play chords. Then combine all three to build a loop-based composition.

Apps For Coders

DevSpace provides fast access to work items and queries. Features include build status push notifications on the start screen and convenient access through secondary tiles. Cortana integration means DevSpace also responds to voice commands.

Designed for Windows Phone the Work Item Studio app lets you view, create and edit work project items in Visual Studio Online. It also lists all your work item tracking queries (with associated result count), which can be executed as required or marked as favourites.

With so much on offer, why not visit the Microsoft Garage website today, at **microsoft.com/en-us/garage**. mm

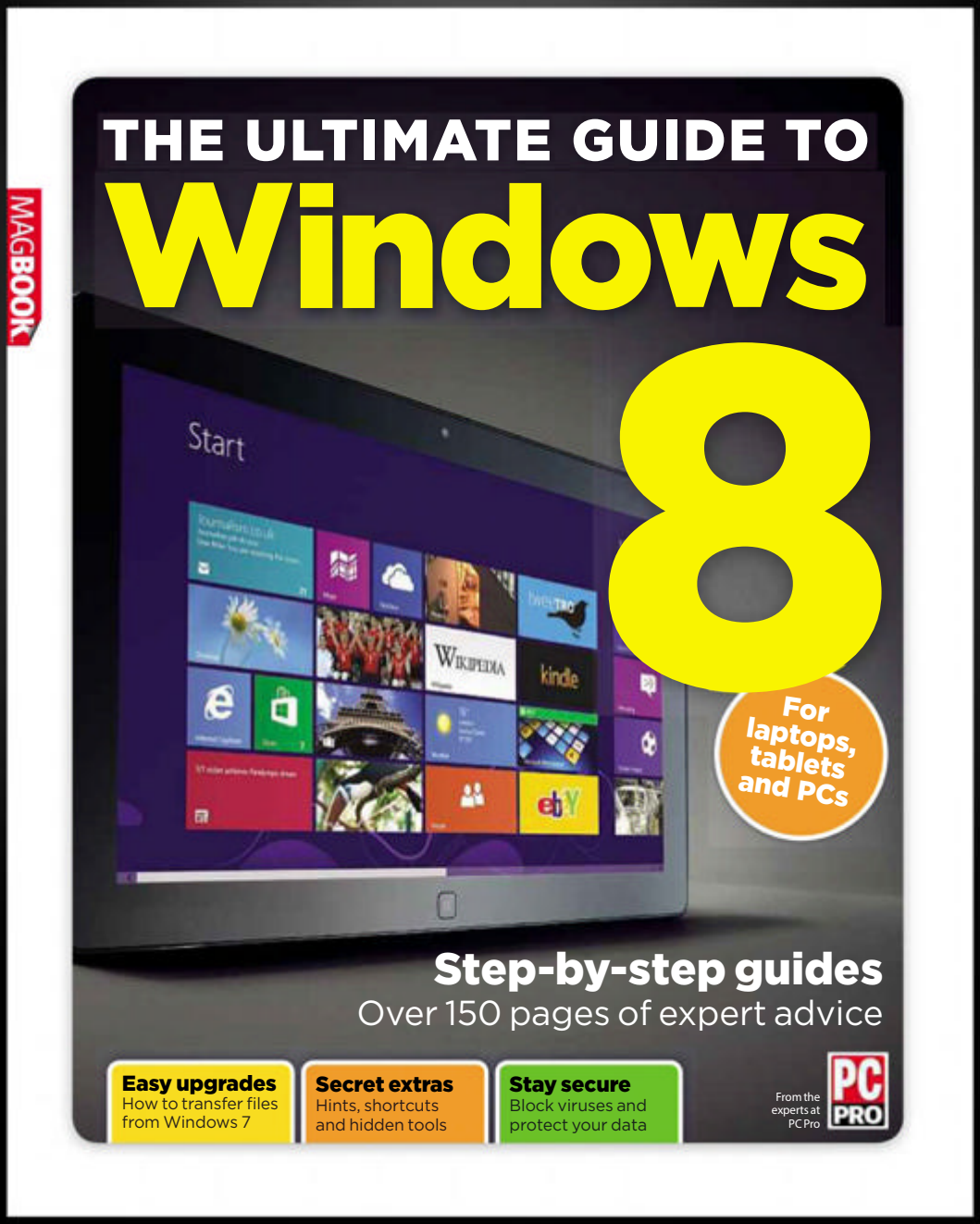
Links

Garage Story: news.microsoft.com/stories/garage/index.html
Garage home: www.microsoft.com/en-us/garage/
Garage workbench: www.microsoft.com/en-us/garage/#garage-workbench
Garage profiles: www.microsoft.com/en-us/garage/#garage-profiles

Soniya Khoja and Milind Solage

Everything you'll ever need to know about **Windows 8**

MAGBOOK



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Component Watch

Component Watch

A cheap tablet doesn't necessarily mean compromise anymore

Cheap tablets have now well and truly entered the marketplace. This means that, even if you can't afford an iPad, there are still plenty of very good options available to you if you want to get into the game. The Nexus 7 might be dead (no-one's really sure), but that doesn't mean you can't find plenty of other cheap tablets that will perform admirably. To prove it, we've taken a look at the best prices out there.

Deal 1: Hannspree HANNSpad 10.1
RRP: £106 / Deal Price: £90

Perhaps the cheapest 10.1" tablet on the market right now, the Hannspree HANNSpad has a 1280 x 800 IPS touchscreen backed by a 1.3GHz Cortex-A9, 1GB of DDR3 memory and 16GB of onboard storage, which can be expanded through the use of a microSD card. It also has a MicroUSB port and mini-HDMI out port (something that you're not guaranteed to find on more expensive models), with a 0.3MP front camera and 2.0MP rear camera. What's more, it runs Android 4.4. Quite simply perfect for people who want a big screen at a low price.
Where to get it: Ebuyer (**bit.ly/1LSabBg**)

Deal 2: Linx 8
RRP: £106 / Deal Price: £90

This Windows 8.1 tablet has a 1280 x 800 8" screen (making it considerably higher in terms of PPI than the Hanspree), an Intel Atom CPU for laptop-like (or, at least netbook-like) performance, and comes with a free 12-month subscription to Office365, giving you access to the familiar Office suite wherever you are. It's about as cheap a Windows tablet as you can find, and with 32GB storage, 1GB of RAM and two cameras there's no danger that you'll be losing out by buying one. If you're wedded to Windows, and on a budget, there's probably not a lot of reason to look much further, if we're honest.
Where to get it: PC World (**bit.ly/1DSumL0**)

Deal 3: Asus MeMO ME176CX
RRP: £128 / Deal Price: £99

10" and 8" devices might be fine, but what if you want a classic 7" device? In that case, the Asus MeMo M176CX might be worth looking at. Its 1280 x 800 7" screen has 10-point input, and you get an Intel Atom CPU with 1GB of RAM, 16GB of EMMC flash storage AND 16GB of Asus cloud storage free for a year. Extras include MicroSD support, front and rear cameras and stereo speakers.
Where to get it: (**bit.ly/1HyP8Ak**)

Deal 4: Archos Elements 80b
RRP: £149 / Deal Price: £126

Archos was once known for its MP3 and media players, but its tablets are just as strong. The Archos Elements 80b has a 1.6GHz Cortex-A9 with 8GB of flash storage, 1GB of RAM and two cameras. It runs Android 4.2 and, while the 8" screen isn't particularly great at 1024 x 768, it does support full HD output through a mini-HDMI port. If the price looks high, that's because it's housed in a full aluminium case instead of the plastic usually found on cheap tablets, so it's a little sturdier than some!
Where to get it: Scan (**bit.ly/18UFVUf**)

Deal 5: Samsung Galaxy Tab 4
RRP: £169 / Deal Price: £140

Samsung make some genuinely iPad-rivalling tablets, so if you can find the Galaxy Tab 4 for under £150 you know you're onto a winner. A 1280 x 800 7" touchscreen with 8GB of flash storage and 1.5GB RAM give it competitive power for the price point, and the 3MP rear camera and 1.5MP front camera mean it's in front of every other tablet on this list in terms of imaging power. Combine that with Android 4.4 and you know it's worth the money.
Where to get it: Argos (**bit.ly/1DTcy2c**)

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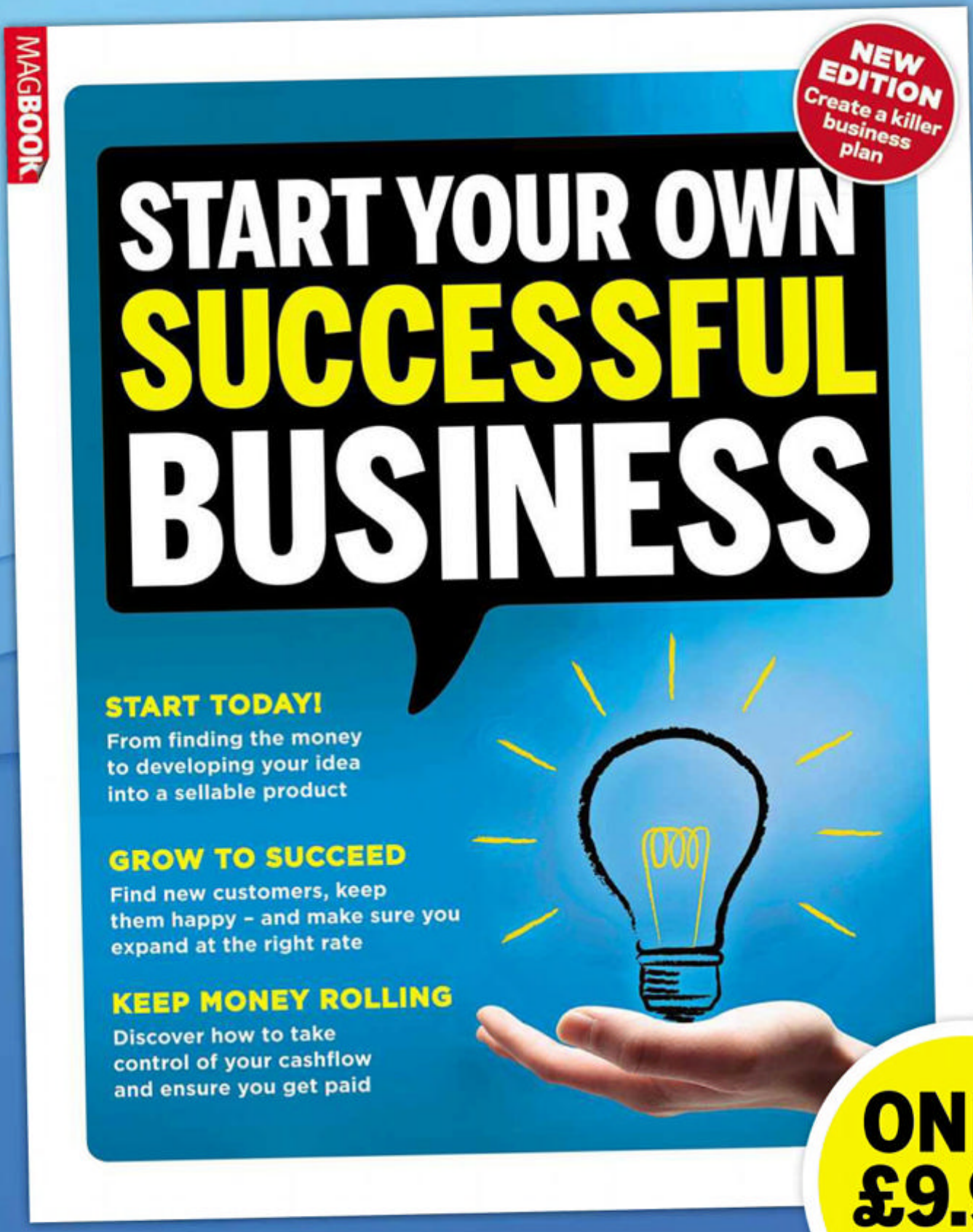

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Join The Club

TNMOC wants you!

New Lumia From Microsoft

Fresh dual-SIM model with Office and OneDrive

Microsoft's Lumia brand line has a fresh new addition in the 4" shape of the Lumia 430 Dual SIM smartphone. Kitted out with a 1.2GHz dual-core Qualcomm Snapdragon processor and pre-loaded with the Windows Phone 8.1 OS, the Lumia 430 Dual SIM handset promises to be affordable (the most affordable option yet, in fact) for interested parties. It also comes pre-loaded with Office, Skype and OneDrive, with up to 30GB of free cloud storage.

That 4" WVGA display is worth noting too, as is the opportunity to assign unique profiles to SIM cards such as "work" and "family". Finally, let's not forget the 8GB memory and not-especially impressive 2MP rear camera.

Fill yer boots with information, if you'd like, with a closer look at the Microsoft site where you'll find all that kind of thing.

iPhone Camera From Manfrotto

Protects handset too

As a leading provider of equipment and accessories for the photography industry, Manfrotto has strengthened its KLYP+ range of phone accessories with the addition of a case for the iPhone 6 and 6 Plus handsets.

Designed to provide protection for the handsets, as well as enhancing the photographic functionality of the phone, the case is constructed of strong polycarbonate to protect from scratches and drops. Each case also comes with a small kickstand and a tripod adapter to allow it to be connected to any camera support at hand.

Six interchangeable lenses offer extra functionality – such as a super wide angle, a Polarizer that reduces glare, a two-in-one lens to enlarge the field of view and Telephoto 3x lens. Furthermore, a continuous LED light with surface mount technology makes it possible to take clear photos and videos in any light condition, while the improved KLYP+ app has also been updated with a new UI.

You can buy this handy by of kit for around £25 by visiting **www.manfrotto.co.uk**.

QUICK BITS... The Microsoft Band can now be pre-ordered in the UK, with an April release date set for the £169.99 fitness

Interested in computing history? Want to join a club of people similar to you? Then, hey, The National Museum of Computing has answered your prayers.

The new Club's first president is Margaret Sale, TNMOC trustee and wife of the late Tony Sale (who led the Colossus Rebuild team). The cost of signing up is an annual fee of £45.

As for reasons to join up, Club members' benefits include a season ticket to the Museum, regular newsletter *InSync*, shop discounts and invites to members' open days for behind-the-scenes access. If you're an existing TNMOC member, you automatically become a member of the new club.

Find more details, if you need them, at **www.tnmoc.org**.

Videoconferencing Solution From ViewSonic

Integrated webcam monitor packs a punch

Monitor specialist ViewSonic would very much like you to know about its new 24" Full HD integrated webcam LED monitor, the VG2437Smc. So, here goes...

The display comes complete with a 2MP Full HD webcam, integrated echo-cancelling microphone, stereo speakers and SuperClear MV wide-viewing angle display technology. This is an important display for ViewSonic, as the company is estimating that desktop videoconferencing will grow by 16% in the future.

This particular display is designed for use with Skype, Google Hangouts, Cisco Jabber and to generally convert your common-or-garden desktop PC into a future-proof videoconferencing solution.

Have we told you yet about its two USB and mic/headphone ports for connecting headsets and 20M: 1 dynamic contrast ratio? No? Well now we have! Read more on this £199 monitor at **www.viewsoniceurope.com/uk**.

A few years ago, I got myself a Galaxy S3 smartphone on contract, and I made the decision to protect it with third-party insurance. After a completely indicent-free year, I decided not to renew this. And that, of course, is when something actually went wrong.

Perfectly demonstrating the dangers of texting while peeing, I managed to drop it into a toilet. Unlike the S5 I have now, it didn't have any kind of waterproofing features, so naturally I feared it would now be an ex-phone.

The good news, though (other than it being my own toilet rather than a public one), is that I fished it out quickly (yes, I know), and after taking the whole phone apart, drying the parts and putting them back together, it all worked fine. Well, there was some water in the microphone, but I'd rather not go into how I extracted that.

The point is that if you spill liquid on your electronics, quick action really can save them. And also, don't take your phone into a toilet.

See you next time…

Anthony

Editor

Meanwhile... On The Internet...

Anyone following the trends of this year's SXSW coverage couldn't help but notice the traction that Meerkat's been getting in the column inches (**tinyurl.com/MotI1356a**). The app (**tinyurl.com/MotI1356b**), which allows you to stream video to your Twitter followers, has been the big social media news of 2015 so far – a seemingly killer implementation of a well-established concept, so slick that one could only really sit back and admire it.

The nascent interest in Meerkat was then further piqued by Twitter's decision to restrict its access to its 'Social Graph' (**tinyurl.com/MotI1356c**) and blocking the tweets that are automatically sent out when you begin a stream via the app (**tinyurl.com/MotI1356d**). It was the kind of spat that fuels viral news stories and garners publicity good and bad, and it bought with it the 'How can Meerkat survive now?' think pieces. It's a good question, frankly, especially when you consider that Twitter has its own direct competitor to Meerkat, in the form of Periscope (**tinyurl.com/MotI1356e**) – which could prove the fatal second blow to the short-lived media sensation.

Periscope ostensibly provides exactly the same service as Meerkat (**tinyurl.com/MotI1356f**) but with a slightly relaxed take on the Snapchat-ish self-destructability for the footage (Periscope allows viewing for up to 24hrs, and all footage is saved to the streamer's own iOS camera roll (there's currently no Android version). It seems that the speed with which Twitter reacted to the Meerkat concept piggybacking on its platform surprised the smaller concern, though it insists that it has plans for the future that don't rely on the goodwill of the social network (**tinyurl.com/MotI1356g**). Time will tell if it gets the chance to implement them or whether Periscope will simple prove too strong a draw.

It may surprise you to know that the browser with the most recorded vulnerabilities in the last year was... *drumroll* Google Chrome. At least that's what Secunia asserts in its annual vulnerability review (which you can download in PDF format if you visit **secunia.com**), which uses data harvested from its Personal Security Inspector software (**tinyurl.com/MotI1356o**). Of course, as Internet Explorer users from the noughties will tell you, being the top of the browser pile (as Chrome now, undoubtedly, is: **tinyurl.com/MotI1356p**) means you attract more attention, so the 504 Chrome vulnerabilities may sound a lot (especially from a total pot of 1,035 browser flaws) but are possibly a reflection of the increased awareness of such problems – further enforced by the significant rise in the total number found across all browsers (**tinyurl.com/MotI1356q**).

The report also concluded that total vulnerabilities (across 3,870 applications from over 500 vendors) topped 15,000 for the year, up 18% since the 2014 report (and 55% since 2009). However, happier news was that while the flaws were spread far and wide, 83% of them were patched by the time they became public knowledge. Worryingly, though, 84.3% of them were patched 30 days later, which seems to show that if it isn't patched quickly, you're just going to have to wait and hope nobody exploits it (**tinyurl.com/MotI1356r**).

Indeed, as Secunia noted, we "should not presume to be able to predict which vendors are dependable and quick to react, when vulnerabilities are discovered in products bundled with open source libraries."

Crowdfunding is now a well established means of getting stuff done these days. But while the new *X-Files* episodes we're going to be getting (and which got all the sci-fi geeks of a certain age so excited last week) didn't need your money to get made (**tinyurl.com/MotI1356h**), the fact that the guys from the Broken Lizard comedy group (**www.brokenlizard.com/**) needed its fans to stump up some cash in order to get the sequel to their 2001 cop-comedy *Super Troopers* made, despite having a script and some level of studio distribution already in the bag (**tinyurl.com/MotI1356i**), was something of a surprise. Nevertheless, that was seemingly the disappointing situation – and perhaps an interesting reflection of the times in which we live.

However, following in the footsteps of the somewhat controversial *Veronica Mars* kickstarter (**tinyurl.com/MotI1356j**), the project flew through its $2m goal in just one day and is now working towards stretch goals before it closes in late April (**tinyurl.com/MotI1356k**), meaning that the project is a go. What it also probably means is that crowdfunding is here to stay in the movies, certainly for cult titles like this. Whether this is good (inasmuch as niche films may no longer have to go, cap in hand, to studios in order to get made) or bad (some will just see this as a way to pre-sell their movies, thus cutting out quality control), we're not so sure. Again, time will tell.

.AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

We love *Star Wars*; all you regular readers will know this. We love Japanese animation, you probably know this too. Therefore this week's AVWHY, *Tie Fighter*, was a dead cert from the minute we set eyes on it – and is presented with no more comment than 'Oh yesssssss!' (**tinyurl.com/MotI1356s**).

If you're like us, and you're not the kind of people who like to sit through corporate keynotes but want to know what's going on, here's Mashable's two-minute compression of Facebook's F8 developer ~~love-in~~ conference headlines. It's well worth a look (**tinyurl.com/MotI1356l**), even if it's just to laugh at Zuckerberg's jib-jab video.

Aaaaaaaand Finally...

Yeah, so, Beer got a musical courtesy of Improv Everywhere (**tinyurl.com/MotI1356m**), though we're not sure it'd be so clean cut in a British pub ona Friday night. And there's no way we could not mention the Hodor versus Groot rap battle, was there? Even though it joyfully trashes the genre (**tinyurl.com/MotI1356n**).

QUICK BITS... The Android Auto app is now available for UK consumers, limited to Android 5.0+ devices

Caption Competition

Two week's ago, we asked you what you thought these two youngsters were up to. Here are some of your suggestions:

- **JayCeeDee:** "The kids saw their Christmas present list on Dad's computer."
- **Dwynnehugh:** "Hey, we found the Any key – it's there on the screen!!!
- **idunno:** "The teachers go on strike tomorrow!"
- **wyliecoyoteuk:** "Woohoo! We managed to install Windows10 on the Apple! Daddy will be pleased!"
- **EdP:** "Option+Command->Displays rotate 180".
- **EdP:** "Whoo-whoo, bet we learn some new words when Daddy turns this on!"
- **Ritasueandbobtoo:** "Look how fast Daddy's new laptop can delete files."
- **doctoryorkie:** "Next generation isheep. Baa!"
- **phantom9:** "Yeah! Finished at 5/4 odds on favourite. This is great!"
- **Thomas Turnbull:** "Yippee the teachers are on strike and the school's closed."
- **Thomas Turnbull:** "There's Wally!"
- **Tony Foster:** "Yay!... We cracked the parental controls."

Thanks to everyone who entered this week, and well done to our winner, PlaneMan, who suggested the somewhat topical (though probably not by the time you read this) "Clarkson is back!"

To enter this week, head to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) and say something funny (but not too rude) about the picture below or email us via **caption@micromart.co.uk**.

PlayStation Now Beta Begins In UK

Service finally greenlit over here

While our friends in the US have been able to take advantage of Sony's PlayStation Now game streaming service, things have been a little different over here in the UK. Until now, that is; as we now have word that the service has begun private beta testing over here too.

Available to PlayStation Plus members who own a PS4, users will be given the chance to experience PS Now by registering their interest in becoming a participant at the following web address, **www.playstation.com/psnow**. We wouldn't hang about, if we were you.

As for what PS Now does: it will bring some of the biggest titles from the PS3 console via the cloud – initially for free, though a later stage in the trial will add a "low rental cost". For this private beta, the games will include *Uncharted 2*, *The Last of Us* and *God of War: Ascension*. Register your interest if this sounds like your kind of thing.

Amazon Drone Dream Gets Lift

Prototype approved; Ron Swanson polishes gun

The chaps behind Amazon's delivery drone project will be a little bit happier at the news that the US Federal Aviation Administration has approved the testing of the drone outside.

The FAA has been widely reported to have issued what's called an "experimental airworthiness certificate" that will allow test flights over private, rural land in Washington state. Furthermore, it made Amazon exempt from other flight restrictions meaning that the drone can conduct its flights. For Amazon, this means that its plans for delivering packages to customers throughout the States have edged just a little closer.

amazon.com

Snippets!

Summer Launch For 10

Excited about Windows 10? Not long to wait now, then, as a head honcho at Microsoft announced at the Windows Hardware Engineering Community summit in China that the OS will launch in 190 countries and 11 languages around the globe this summer.

Woo, and indeed, hoo. The summit was also the latest showcase for biometric authentication feature Windows Hello.

Facebook Hoax Arrest

A Californian man has been arrested and subsequently placed in psychiatric care after posting a hoax suicide threat online. The BBC reported that the man involved apparently stated the reasoning behind the hoax as being that he wanted to test Facebook's suicide prevention programme. However, when a fellow Facebook user alerted the police over the threat, he ended up in hot water.

BT-Barclays Team-Up To Support Libraries

England's libraries and community centres have been handed a timely boost by BT and Barclays who have announced a joint partnership in order to provide free wi-fi and digital support at locations across the country.

The community programme will initially provide 57 libraries and 13 community centres with wi-fi and additional sites will be announced at a later date. From Barclays, its specially trained staff – Digital Eagles, as they're know – will be on hand to swoop in at the new sites, with a view to helping others to build confidence and skills to succeed in the digital world.

Swedish Teen Is In Big Trouble

Big damages sought for hack

According to press reports, the authorities of Umeå in Sweden are looking for around £40,000 in damages from a teenager that hacked into its IT system.

The authority wants the money because of the fallout from his dalliances within the city's network system, something the boy claims he did boy did in order to demonstrate how poor the associated security was. During his incursion he managed to access a database of over 600 passwords and the damages are to compensate for all the time officials had to spend going through the systems to change the passwords again.

According to *The Register*, the teen claims to have not stolen or damaged anything himself – and that his handiwork took no more than an hour.

An hour's work for £40,000. Ouch.

PlayStation Pushes Blood Drive For Bloodborne

Unique promotion from Denmark

Video game developers will often try new and creative ways to market a new title in order to make it stand out from the crowd. However, in Denmark, PlayStation has chosen to promote the title *Bloodborne* by launching a blood drive to give consumers a chance to get their hands on a copy for free. Yes, people could donate blood to be given the opportunity to get the game, alongside a bunch of titles on offer. Everyone taking part was also entered into a contest to win a PS4 console.

Well –and we really don't get to say this too often – it's certainly an orginal PR strategy original, and (hopefully) also a boost for blood stocks in the country, which is after all the real winner here.

Amazon Fire TV Stick For £7!

Offer was for new Prime members only

Amazon's Fire TV Stick can be pre-ordered now for a April 15th release date – a fact the company trumpeted with a market-shaking cut-price offer allowing anyone who signed up to an Amazon Prime subscription (costing £79 a year) to purchase it for just £7, rather than the usual £35! Unfortunately, that offer – which also saw existing Prime members able to pick up a dongle for £19 – has now lapsed, but it was clearly meant to kickstart the UK launch of this potential Chromecast killer.

Marketed as "the most powerful streaming media stick", we can only imagine that this will do good business. In terms of that power, the Amazon site suggests four times the storage and twice the memory of Chromecast, while included content providers include Netflix, Vimeo and Amazon's own services sitting alongside the BBC iPlayer and Demand 5. Look it up for yourself at **www.amazon.co.uk/firetv**.

QUICK BITS... **The UK government has invested further into cyber security research by granting £5m to**

Get Sporty With Hannspree

Smart sports watch at smart price

The latest technology fad is undoubtedly focused on fitness trackers and smartwatches designed to help you look as well as feel good. However, if that's a train you're yet to climb aboard, it's quite possible that price has been a problem.

Recognising this, Hannspree has put together a sports watch of its own, called the Smart Sports Watch, that will cost a meagre £30. It will sync to a smartphone via Bluetooth, receive message and call notifications, track weight loss, monitor sleep and help with fitness management. Other features include an on-board pedometer that counts how many steps you've taken throughout the course of a day while the phone can also count your calories, so it does seem to promise much of the functionality of more expensive solutions. As for phone functionality, the watch will also alert of messages and calls from a synced phone (Android 4.3+ and iOS 7+) and its battery power of 8-10 days isn't too shabby either.

Presumably, by launching around the recent Apple Watch announcement, Hannspree is hoping to entice people unwilling to pay Apple's premium to this device. Nobody's suggesting that this is going to be causing Apple any sleepless nights but it certainly sounds like a promising, low-cost option.

High-Performance SSD? Yes Please!

HyperX line-up goes even faster

Kingston's high-performance HyperX line has welcomed in a new member, as the Predator PCIe SSD promises the fastest speeds in the already impressive HyperX range.

Offering large capacities of 240GB and 480GB, the PCI-generation drive is powered by the Marvell 88SS9293 controller and delivers speeds up to 1400MB/s read and 1000MB/s write, meaning better multitasking and an overall faster system.

You can read more on this interesting new addition at **www.kingston.en/hyperx**.

GB Maps Now Open From Ordnance Survey

Four new fully customisible mapping tools

The Ordnance Survey has been working hard on four new open data products that are now ready for use by the public. That would be us, then.

Offering better detail and accuracy, the tools are fully customisable and can be imported and integrated with other software and databases. The OS Open Map is arguably of most interest, providing a backdrop for users to map and visualise data, with features including urban and rural features across the entire Great Britain, overlaying of datasets including utilities and population stats, plus analysis of a location to identify certain points of interest

Another of the tools, OS Open Names, is a location search tool with an index of over 2.5 million locations in Great Britain, with search accurate to within a metre.

Read up on these and the other tools on offer over at **www.ordnancesurvey.co.uk**.

expand the Centre for Secure Information Technologies in Belfast

Gigabyte GA-F2A68HM-HD2 Motherboard

From tiny motherboards grow great PCs

DETAILS
- **Price: £31**
- **Manufacturer: Gigabyte**
- **Website: goo.gl/W89M3s**
- **Required spec: FM2+ socket CPU, DDR3 memory**

Specifications:
- Socket FM2+ supports AMD FM2+/FM2 A-series APU.
- Gigabyte Ultra Durable 4 Plus technology.
- Audio Noise Guard with high-quality audio capacitors.
- HDMI 1.4, dual-link DVI, D-sub ports for triple-monitor support.
- Native USB 3.0 and SATA3 ports with RAID support.
- Gigabyte UEFI DualBIOS.
- Gigabyte On/Off Charge for USB devices.
- All solid capacitors design.

Gigabyte has quite an impressive range of micro-ATX boards on offer these days, each offering something different or adding to an existing feature from the last revision. Finding something that combines everything in a single, inexpensive and small package can be quite a chore at times, but thankfully such a thing does actually exist.

The Gigabyte GA-F2A68HM-HD2 is an FM2+ motherboard for AMD processors up to the A10-7850K, with an AMD A68H chipset, a pair of DDR3 DIMM slots and expansion slots in the form of a single PCIe x16, PCI-e x1 and a PCI slot.

You'll also find four SATA 6Gbps connectors, two USB 2.0 headers, an APU header fan header, a pair of system fan headers and S/PDIF out. The back panel features two USB 3.0, four USB 2.0, HDMI, DVI, VGA, three audio jacks and a PS/2 keyboard and mouse port.

Gigabyte has upped its game in the quality department in recent years, enough to put the wind up the likes of MSI at least. This is apparent with this model, as you'll find solid capacitors throughout, high-quality Nippon Chemicon ARE series audio capacitors, humidity protection and protection from power failure, surges and electrostatic charges. This is one of the Ultra Durable 4 Plus range of boards, so you can expect a pretty solid base on which to build your next system.

Aside from being a stable motherboard, the GA-F2A68HM-HD2 also has support for AMD's Dual Graphics technology, which is basically a kind of CrossFire setup for a Radeon card and the integrated GPU found on the A-Series processors. For example, if you use an A10-7850K CPU, which has a Radeon R7 APU, then you can successfully pair it up with a Radeon R7 250. The result is a far more capable gaming and 3D graphics PC.

Likewise, there's also support for 4K through the HDMI port and multiple monitor support through the DVI and HDMI ports with the AMD Eyefinity technology.

Either way you look at it, the Gigabyte GA-F2A68HM-HD2 proves to be a motherboard that punches well above it weight. And at an average price of £31, it's cheap enough to consider for a number of applications.

Despite its micro-ATX form, the board doesn't feel too cramped. Granted there's not a lot of room between the PCIe x16 and x1 slots, especially if you fit a dual-slot graphics card in there (depending on the card, you probably won't have access to the PCI-e x1 slot at all), but you should be able to get access to the PCI slot without too much trouble.

The same goes for the positioning of the memory slots and the CPU socket, in that there's probably just enough room for one of the bigger model coolers and slightly higher RAM sticks to coexist without touching or creating a hazard for other cooling solutions.

We think, then, that the Gigabyte GA-F2A68HM-HD2 is a perfectly adequate motherboard, complete with higher-quality components and the kind of features you'd normally find on a more expensive model. **mm**

David Hayward

Small and inexpensive but feature-laden and reasonably powerful

Crucial BX1000 1TB SSD

Crucial adds some new cheaper options to its SSD range with the BX100

DETAILS

- Price: 120GB - £53.99, 250GB - £84.99, 500GB - £153.99, 1TB - £306.99
- Manufacturer: Crucial
- Required spec: System that accepts SATA drives in 2.5" format and can configure for SSD operations

There are two battles going on in the world of the SSD; one is for ultimate speeds, and the other is for enhanced value.

Crucial's new BX100 range is certainly tilting at the latter, though it's hardly what you might call pedestrian from a performance perspective.

The BX100 comes in four sizes, ranging from the modest 120GB, through 250GB to the larger 500GB and the monster 1TB model reviewed here.

Which you choose will not only impact on the capacity you get but also the performance levels you might expect. The slowest is the 120GB model, which only achieves 185MB/s writing, and then they get progressively quicker as the devices scale.

The top two drives have identical performance specs, so what I say for the 1TB is also applicable to the 500GB model. Having these discrepancies does make for a buyer beware scenario, but it's an inherent side effect of how the flash dies are combined to build the SSD.

What's probably more important with the BX100 design is that all the drives manage a superb read speed of 535MB/s, or the technology ceiling as we've now come to expect under SATA-3.

Read performance aside on the smaller drives, most people buy these things for their system to boot rapidly and their games to load smartly. And this drive does that well at every price, irrespective of the capacity.

The controller used here is the Silicon Motion SM2246EN, the same one that appeared in the Corsair Force LX series last year, if memory serves. But what struck me was that with very similar hardware the BX100 is about 20% quicker at writing, presumably because Crucial did something clever with it.

As a result, the 500GB and 1TB drives are not only maxing out SATA for reads, but they're also knocking on the writing limits door too. My benchmarks revealed that the 1TB drive exceeds the quoted write speed by about 10MB/s and is almost exactly true for the read performance.

With a MTBF (mean time between failures) of 1.5 million hours and 72TB TBW it should also be more reliable than a hard drive over the three-year warranty period.

But the killer aspect here is the price, being roughly 30p per GB across the range. So would I buy this 1TB drive for just north of £300? No, oddly. As the price is almost identical, I'd buy two 500GB BX100 drives, and then RAID 0 them for some utterly ridiculous performance with the same capacity.

If we suspected that the era of high-cost performance SSDs was over, the BX100 proves it categorically.

mm **Mark Pickavance**

Capacity	Part number	Sequential Read MB/s	Sequential Write MB/s	Random Read IOPS	Random Write IOPS
120 GB	CT120BX100SSD1	535	185	87k	43k
250 GB	CT250BX100SSD1	535	370	87k	70k
500 GB	CT500BX100SSD1	535	450	90k	70k
1 TB	CT1000BX100SSD1	535	450	90k	70k

A performance and price combination that is hard to ignore

D-Link ShareCenter DNS-327L

D-Link joins the personal cloud space in its NAS box range

DETAILS
- **Price: £100 with no drives**
- **Manufacturer: D-Link**
- **Website: www.dlink.com/uk/en**
- **Required spec: Wired network or broadband router**

Not everyone wants the fastest NAS box or a massively flexible platform. Often they just want somewhere to store and globally access their files that isn't owned by Google, Microsoft or Dropbox.

D-Link's ShareCenter DNS-327L is a revamped version of its incredibly cheap dual drive DNS-320L NAS box (now £39.99), whixh brings personal cloud functionality to the table for an amazingly low price, if you provide your own drives.

For the extra outlay you get a faster 1.2GHz Marvell CPU, twice the RAM (512MB), volume encryption and, critically, cloud storage backup to Amazon S3, D-Link Vault and Google Drive. All ShareCenters support S3, but you'll need this one if you want to have bi-directional access to Google Drive.

This glossy, white, plastic box with an angled top is a sideways nod to Western Digital's MyBook designs, though internally it isn't quite as elegantly engineered. The lid detaches easily, revealing a metal tube that takes two 3.5" SATA drives, to be supplied by you, vertically.

To help you more easily remove the drives later, D-Link provides a couple of plastic handles that attach to the drives so they can be pulled out.

With only two drives your options are somewhat limited, but the system allows you to join the capacity of the two disks, keep them independent or mirror if they're the same size. There's a single USB 3.0 port on the back, which you can use for increasingly overall capacity using an external drive or for sharing a USB printer.

> **"The Google Drive functionality is rather neat"**

Drive installation takes only a couple of minutes, and you're ready to fire up the unit and complete the installation using software provided on a disc. The wizard can be downloaded online, and there's an Apple Mac version if you are that way inclined.

Wherever you find it, the installation wizard is way too clunky for this reviewer's taste, as it insists on configuring all manner of features that could easily be deferred until the system is actually operational.

It also creates a link to the mydlink website on your desktop calling explorer.exe from the system32 folder, where it doesn't live.

That mistake hints at a lack of polish in the software side of this equation, and the web interface supports that assertion. While it looks pretty, it's lacking in overall structural consistency and is missing some important obvious features. I've never before seen a NAS box that will install new firmware but hasn't the means to check if any new versions are available, for example.

Conversely, what features D-Link did put on the ShareCenter DNS-327L generally work well, and the file serving performance for such an inexpensive solution is good.

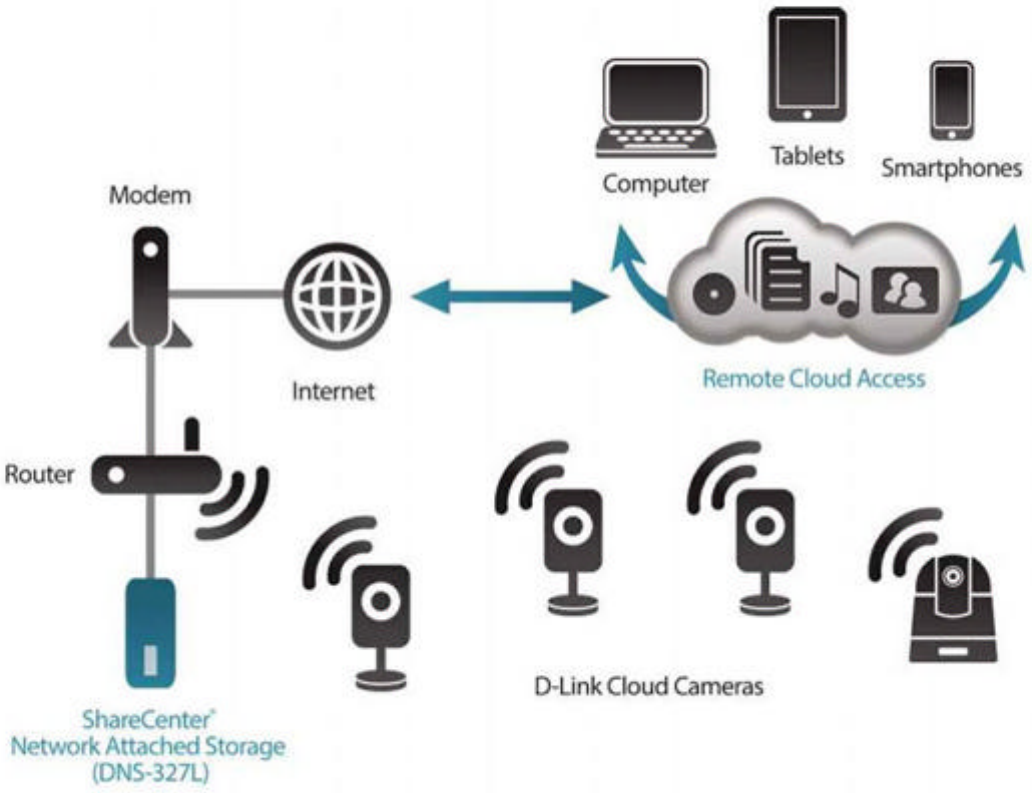
With a single 2TB drive installed I achieved consistent read speeds of 110MB/s and very acceptable writing performance of 75MB/s. That's on single large files, though multiple smaller files tended to be much slower, revealingly.

The Google Drive functionality is also rather neat, once I'd eventually discovered where D-Link had hidden it. If you've got a headline feature, surely you make it appear by default?

Default settings were generally an issue, because the box never encourages you to create groups and users (that it supports), and when you've formatted the drives the newly created volumes are immediately available to anyone on your network.

This left me with the impression, wrong or not, that

Features:
- **2 Bays for 3.5 inch SATA I/II Hard Disk Drives**
- **512MB RAM 128MB Flash Memory**
- **Gigabit Ethernet Connection**
- **Maximum Capacity:** 8TB



> **It just needs a very critical eye to weed out obvious errors**

D-Link had decided to focus on the showboat features of its competitors without actually finishing its NAS OS platform beforehand.

That's a shame, because what it has isn't that bad; it just needs a very critical eye to weed out obvious errors and provide some sense of overall structure. The interface can't even decide if the limited software tools are 'add-ons' or 'applications', and there isn't currently an automated mechanism for D-Link to launch new ones and bring their availability to your attention.

The personal cloud end of the equation is equally haphazard, with it taking me at least three D-Link apps to find the one that would actually connect my Android phone. To get this functionality fully working I needed to go back to the web interface because enabling the UPnP AV Server feature doesn't inherently make multimedia shares available, frustratingly.

While I was able to get all I needed for the review out of the ShareCenter DNS-327L, I do wonder what a less technically minded and determined user might make of it.

What it has going for it is the low price, and acceptable file sharing speeds. However, you can pick up a Synology DiskStation DS214se for just another £20, so that price might not be cheap enough.

With NAS boxes the devil is certainly in the detail, and that's where the DNS-327L is somewhat lacking. I'm sure that D-Link will fix it, and when they does, the DNS-327L could be a very desirable piece of kit. **mm**

Mark Pickavance

An inexpensive NAS box with some cloud functionality

Seagate NAS HDD 4TB

Seagate cuts itself a slice of NAS media sales pie

DETAILS
- **Price: £129.99 (Dabs)**
- **Manufacturer: Seagate**
- **Website: www.seagate.com**
- **Required spec: SATA NAS box**
- **Part No.: ST4000VN000**

Features:
- SATA-3 5900RPM 64MB Cache.
- Only 4TB drive optimised for NAS use.
- Quiet drive operation.
- Built-in vibration resistance.
- Built and tested for 24×7 NAS applications.

Normally when I review hard drives, the critical part of the exercise is a speed test. However, I haven't done one for the Seagate NAS HDD, because precisely how quick it operates isn't that relevant.

That's because once you've put a NAS box and a Ethernet network between the drive and your PC, even the slowest drive would deliver around the same performance, because it's not the limiting factor.

Seagate rated the NAS HDD 4TB at up to 140MB/s – about 10MB/s less than the WD Red equivalent. That still faster than I've ever managed to get a NAS file transfer over gigabit Ethernet, and often they'd be used in a RAID configuration for even greater speed. For those who really see this as an issue, Seagate does make the even quicker Constellation CS HDD and ES.3 drives, though frankly they're all just messing around compared with even the slowest SSD drives.

Deeper analysis reveals that while single file throughput is slightly down, under a multi-threaded (and muulti-user) workload it performs rather well against its competitors.

But unless you're specifically told this by benchmarks, most users wouldn't be able to differentiate between this and an alternative in everyday use.

Where this drive is good, undoubtedly, is that it uses very little power, as low as 4.8 watts – a tiny bit more than the WD Reds. That's ideal for a home NAS scenario, where the machine is left on indefinitely. The small difference in power usage between this and the WD Red is probably down to this being a 5900rpm drive, and the Reds are a variable spin speed that may allow for greater power efficiency.

I could read this another way and say that Seagate's design is simpler, and therefore potentially more reliable, yet gets the job done.

> **“Ideal for a home NAS scenario”**

Warranty is the same three years that Western Digital is offering on its WD Red series. If you're sensing that the Seagate NAS HDD was designed and built specifically to match off against a competitor product, that doesn't seem a wild assertion.

Normally this would come down to pricing, but compared with the WD Red 4TB, there isn't much difference at all, with these being just a few pounds cheaper. They're much less than HGST's 7200rpm drives, but as I've explained earlier, in most situations drive speed isn't the limiting factor.

What Seagate lacks with this product range is the larger sizes above 4TB (5TB and 6TB) that Western Digital is offering, but at, 4TB they're very closely matched.

In the end the Seagate NAS HDD is so difficult to separate from its major competitor that it may well become a brand loyalty point. Depending on what historical experience you've had with Seagate would probably influence your buying decision and vice versa.

There isn't anything in this design that makes it an obvious winner, but equally little that would exclude it from being a logical choice.

mm Mark Pickavance

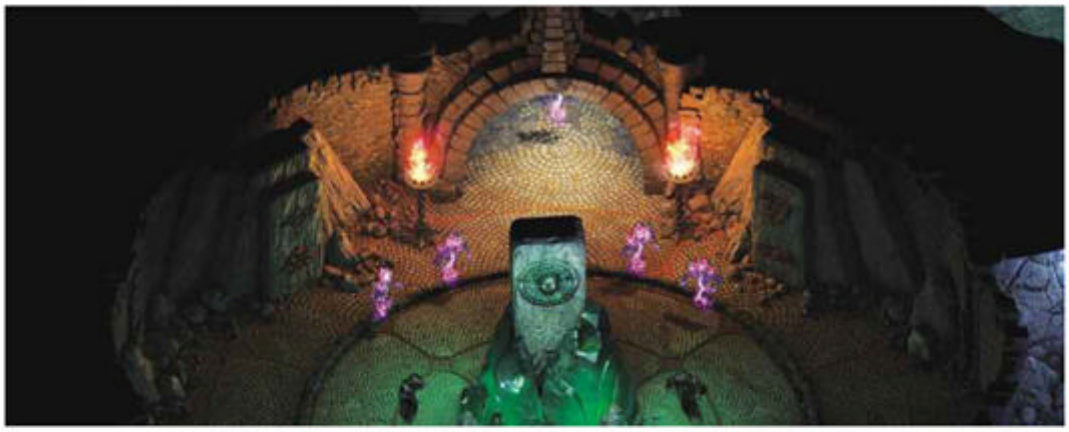
An solid alternative to using WD Reds in your NAS box

Pillars Of Eternity

It's old-school RPG action all the way with Obsidian's crowdfunded fantasy adventure

DETAILS

- **Price: $44.99**
- **Manufacturer: Obsidian Entertainment**
- **Website: eternity.obsidian.net**
- **Required spec: Windows Vista 64-bit or later, Intel Core i3-2100T 2.50GHz or equivalent, 4GB RAM, ATI Radeon HD 4850 or NVIDIA GeForce 9600 GT, 14GB disk space**



For many PC gamers, the golden age of the RPG lay with the Infinity Engine-powered greats like *Baldur's Gate*, *Icewind Dale*, and the superb *Planescape: Torment*. The point-and-click era of RPGs of this kind gave us these classics, and many more, and produced some of the most beloved entries in the genre. These were games that possessed huge quests, deep stories, great characters and a lot of tactical combat. RPGs have evolved over time, and today we rarely see such complex and rewarding releases. P*illars Of Eternity* is here to change that.

Starting out life as a crowdfunding project, *Pillars Of Eternity* is a clear love letter to the retro school of RPG creation, both in its style and execution. There's no need for cutting-edge visuals or modern gimmicks here. What we have is an RPG that gets its inspiration and design from the greats, emulating the brilliant Infinity RPGs of the past.

Like these games, *Pillars* features a game world rendered in 2D, with meticulously detailed environments, and the characters, NPCs and enemies are all 3D models. This mixture of of 2D and 3D works well, and it successfully reproduces the visual style of its predecessors. Gameplay is also similar, with the RTS-style point-and-click control letting you command single or multiple characters at once. Combat features a pause option, which lets you carefully plan your next actions, choosing who does what, the spells you'll be slinging, and other moves, such as special abilities. It's all instantly familiar to any PC RPG veteran, although for those new to the genre, it could be a little daunting, with plenty of sub menus, icons and stats to get your head around. Thankfully, there are constant tutorial messages that help guide you through the basics, even if they do get in the way of the action from time to time. Combat is easy, and the menu system, while complex, isn't that hard to get used to. A little bit of streamlining and more user-friendly design wouldn't have gone amiss, though.

Pillar Of Eternity tells its story via in-game dialogue mixed with fantasy novel-style descriptive text and still image story boards, and while this is adequate and, in today's CG-loaded market, different, it's also a little twee, and many may expect a lot more spectacle from an RPG. The thing is, *Pillars Of Eternity* isn't about that. It's a not a bleeding-edge RPG with amazing graphics and real-time combat; it's all about the classic RPG feel, and in this regard, it's one of the most surprising RPGs I've played in a long time.

It's truly refreshing to play an RPG that doesn't try to wow you with tech or shovel in the latest expected tropes, but instead focuses on story and a deep role playing system, the kind we've not seen much of for years. Is it as good as the classic RPGs it's trying to emulate? No, not quite, but it has a very respectable try, and the result is a game we have to wholeheartedly recommend to long-time RPG fans.

mm Aaron Birch

Selivers a solid and enjoyable adventure

Battlefield Hardline

Cops and robbers gets the Battlefield treatment

DETAILS
- **Price: £49.90**
- **Developer: Dice**
- **Website: www.battlefield.com**
- **Required spec: Core 2 Quad Q9500 or better/equivalent, Radeon R9 270X or better/equivalent, 8GB RAM, 60GB disk space, Windows Vista 64-bit or later, Internet connection**

In the gap between what might be considered full-flavoured Battlefield releases, EA has plumped to back a take on cops and robbers. It's a noble enough objective, particularly as shooters of the Battlefield/CoD variety seem intent on virtual military conflicts topping up the coffers. But does it work? Sort of. Yet to answer with any more depth, you immediately come upon two main issues: "What does Hardline add to the Battlefield legacy", and "Is what it adds any good?". As any game is judged by stable-mates, it's worth first looking at the title's place in EA's superstar series.

What *Hardline* is not and can never be is a replacement for *Battlefield 4*. *BF4* has recently received a substantial update patch and is currently going nowhere. As far as EA is concerned it's a current title, and more, yet-to-be released content was confirmed at the end of last year. Of course, it's not unusual for EA to support previous titles in the series, and Hardline appears less a reshuffling of the Battlefield priorities than a stylish stop-gap. After all, *Battlefield 5* is likely to hit around Q4 2016, and the word is it will pick up once again on the military theme.

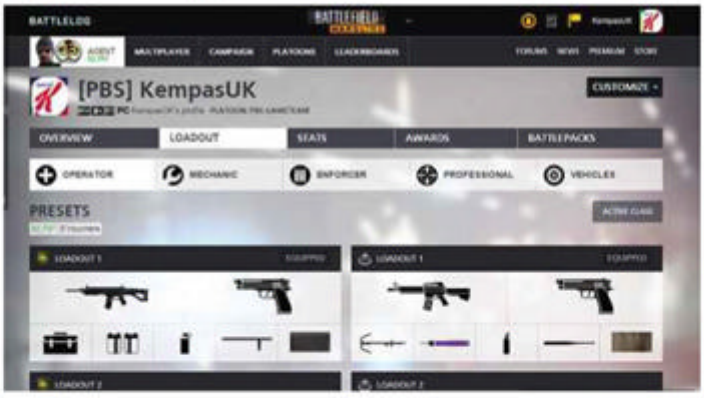
What of the *Hardline* stopgap, then? Well, if it can be called a stopgap, it's a slick, polished, live-wire of one. Re-imagine Battlefield with police special response units and weapon wielding criminals, and you're pretty much going to be thinking of what the title offers. It runs on the same engine as *BF4*, and it looks as though the best is now being made of Frostbite 3 – the latest GPUs will certainly deliver delightful visuals. *Hardline* offers multi-player 'Levolution' too, so those map-shaping destructive setpieces from *BF4* are matched in kind here.

Most buying *Hardline* are likely to jump straight into the multiplayer, but a decent serving of fun is to be had in campaign mode. This fairly engaging experience sees you play Detective Nick Mendoza, a cop who (with his partner Khai Minh Dao) looks to take the fight to a Miami struggling with drug crime. In a series of 'episodes', the plot unfolds like a sort of super-charged series of TV's *CSI Miami*. There's more than a nod to TV cop shows here, even to the point of the "previously/next on *Hardline*" clips you might expect of an HBO/Sky Atlantic production. It's cute, it's odd. It's not really Battlefield.

That thought of 'not quite Battlefield' is a sentiment that some will level at the game as a whole (more on that in a moment). Yet at its core *Hardline* behaves in a way true to the franchise. While the campaign mode seems more like an interactive TV show than ever, it's the familiar on-rails action, equipment unlocks and engaging action that is a friend in new clothing. The key difference is that action is less militarily explosive, but it's interesting, and crucially it's fun. The multiplayer, of course, is different. The immediate difference is the realisation of a gritty law versus disorder battle – and one endowed with true pace.

Hardline's online gaming is frenetic, not wholly unlike a (whisper it) Call of Duty release. And while this provides a different level of enjoyment, it's not quite the tactic-driven 'long-game' approach that Battlefield normally provides. The game's speed is in part due to mechanics and the fluidity of movement in gameplay, but it's emphasised due to the mix of modes and map sizes. 'Cramped' is one word that's sums up a fair portion of the in-game criticism. *Hardline*, being a Battlefield game, allows for 64-player server support. In a traditional BF game, though, that often means warfare spread to four corners of a map by land, air and sea. There's far less of that in *Hardline*, and the general consensus is that 48 players on one server is ample.

Unsurprising really. The car-driving Hotwire mode – where both sides drive vehicles furiously as opponents scurry to take them out – is always high-speed. But at least the action here moves around a map. Heist, which funnels the action to a central point for theft/protection of loot from a vault, is chaotic and can be over within minutes. Similarly, Heist Mode, where money is stolen or rescued from a central point (it can also be retrieved from the opponents' own stashes), leads largely to gunfights taking place in a corridor across the map. This while the outskirts of lovingly



realised, but largely diminutive, cityscapes largely remain untouched.

These differences may take some getting used to for Battlefield veterans and may negatively impact overall impressions. However, it may not be so off-putting to newcomers, who may find redeeming features intact. Indeed, although *Hardline* feels like a small amount of content to pay up to £59.90 for, there are some nice tweaks and genuinely interesting touches that will keep you interested early on. Most noticeable is that weapon, gadget and vehicle upgrades based purely on level and assignment success have disappeared. Now you must simply earn cash to buy your favoured gear.

For the time being at least, this can lead to some interesting tactical battles. With differing kit availability for each of the Operator, Enforcer, Mechanic and Operator classes, your gameplay is shaped accordingly. For example, you may have purchased the grappling hook, allowing you access to roofs. But if you've yet to acquire a gas mask, you're best to stay well clear of confined areas. It's an interesting dynamic, purchasing upgrades to suit and compliment your own style of play. The trouble is, handcuffs and tasers may be fun to use – and likewise the 'Hacker' (Commander) role intriguing - but the impact of these factors may be more apparent if the game supported a more tactical and open-map approach. Or if 'progressive' game-modes opened up new parts of a map, like in *Battlefield 4*'s Rush mode. At the moment, in the absence of any such options, *Hardline* feels less a full release than other newly launched games in the series.

Work will need doing to elevate the game beyond its current status. More, better thought out maps and modes will need introducing and more tactically persuasive gameplay implementing to make it more than just a nice alternative. Currently, many fans of the series are playing both *Hardline* and *Battlefield 4*. And that says it all, because while what *Hardline* adds to Battlefield is fun and different, it's still 'not quite Battlefield', and its stopgap nature reduces the amount players can be prepared to invest in it. For a full-price release, that's a precarious position for it to be in.

mm Kevin Pocock

Fun, furious, but an unusual full release

GROUP TEST

Blu-ray Drive

Like it or not, Blu-ray is here to stay. It may not have caught on quite as much as the creators would have hoped for, but a Blu-ray disc does make for a good high-volume backup solution.

Further to that, watching Blu-ray content is amazing, and on a good system it really brings out the visual glory of a blockbuster film.

David Hayward has six Blu-ray drives to test, to see which play and which burn the best.

Blu-ray Drive

Pioneer BDC-207DBK Internal Blu-ray Drive

DETAILS

- **Price: £46**
- **Manufacturer: Pioneer**
- **Website: goo.gl/Xevyke**
- **Required spec: SATA connection, Blu-ray playback software, Windows 7 or later**

Pioneer has been knocking around the technology industry for as long as anyone cares to remember. It's a long history that includes the LaserDisc back in the late 70s, car CD players in the mid 80s and all manner of GPS navigation devices, DVD players and so on. Basically, it's a company that knows what it's doing.

The Pioneer BDC-207DBK is a standard 5.25" optical drive that offers the user 8x Blu-ray read speeds, 16x DVD write speeds and 8x DVD rewrite speeds; as you can se, then, this is a read-only Blu-ray drive.

However, despite the lack of Blu-ray writing capabilities, it is Blu-ray 3D compatible and offers such enticing technology as QuickStart, which enables the drive to spin up 42% faster than any previous model (according to Pioneer anyway) and some much improved noise suppression.

Unfortunately that's really where the list of interesting features end. This is just a barebones drive; all you get is a SATA cable, which is ridiculously short, especially if you want to wind the cable around the internal structure of the case to help keep the airflow at its most effective.

The lack of software is a bit of a pain. Even an older copy of CyberLink would have been a welcome sight. This naturally means you'll have to source your own Blu-ray playback software, which is a trial in itself most of the time.

The optical disc burning side of things was decent enough. The ten unbranded DVDs we had lying around all managed to burn 3.5GB of data without a coaster in sight, and the same could be said for the CD burning element.

Although the noise suppression seemed to be working well enough, the drive did create some vibration when screwed into place in the case. We did eventually sort this out with four rubber washers between the drive and the drive cage.

The Blu-ray reading can handle BD-R reasonably well. The 25GB discs didn't have any issues at all, even after we paused the drive for five minutes mid-movie and resumed, with only a slight screen glitch before continuing as normal. The 50GB drives. however, needed a few more seconds before they caught up with themselves after the five-minute pause.

If it's basic Blu-ray playback and some DVD and CD burning you're looking for, then for £46 this isn't too bad a choice. But the lack of software, the short SATA cable and the annoying vibrations from the unit don't stack the scores too well in the Pioneer's favour. On the other hand, if you already have Blu-ray software on hand, then for media centre build on a strict budget we can see this drive filling the optical disc gap.

In short, then, an okay drive but lacking in far too many features and extras to warrant a higher score.

micro mart

7 Quality

6 Value

6 Overall

Samsung SE-506CB Slim External Drive

DETAILS
- Price: £60
- Manufacturer:t Samsung
- Website: goo.gl/TiKZJ1
- Required spec: USB port, Windows, Linux, Mac, USB enabled TV

We're always a little wary when it comes to external Blur-ray drives that are USB 2.0 only, because of the sheer amount of bandwidth needed to get all that information onto the screen.

The Samsung SE-506CB is one such external, USB-powered Blu-ray drive that supports BD read speeds of 6x, BD write speeds of 6x, BD rewrite speeds of 2x, DVD read speeds of 8x and DVD write speeds of 8x. Naturally, you can also write to CD.

There are also some interesting extras included with the SE-506CB, such as Linux, Mac and WinCE support, together with the traditional Windows platform, and with it being USB bus powered, you won't need any extra cables or power points.

> **"The main problem we had was the stupidly short USB cable"**

There's also a function called the Samsung AV Connectivity 2.0, which is activated when you hook the drive up to a USB-enabled TV and press the eject button down for a couple of seconds. This puts the drive into an AV connectivity mode, allowing the TV to see the drive as a USB memory device. However, playing anything through the interface is a bit of a chore, as it takes nearly three minutes before the disc is recognised and starts playing.

Thankfully, the Samsung SE-506CB comes with a trial copy of CyberLink PowerDVD, along with the Blu-ray Disc Advisor software, which helpfully told us that our system wasn't capable of running Blu-ray discs, despite being a powerful PC. It may only be a trial run of CyberLink, but at least you can test it to see if it'll run okay on your system before committing to a purchase.

The drive itself was reasonably quiet during the reading of discs. The rubberised feet absorbed the vibration and noise of the disc spinning up, to a degree, but when we started to burn Blu-ray discs, the drive noise increased significantly.

All the Blu-ray and DVD discs we tested were written to without any problems, but the CDs were a different story in that we didn't have a single one work properly. The CDs were unbranded, though, so perhaps this was the problem.

Blu-ray playback wasn't too bad, for an external drive. Aside from the three-minute wait to begin with when hooked up to a TV, the content played well enough. However, we did have to wait another couple of minutes after resuming from a five-minute pause. When connected to a PC the drive was a little quicker, with a 30-second wait before the disc was recognised and around the same after resuming from the pause.

The main problem we had was the stupidly short USB cable that comes supplied with the drive. When hooked up to the TV, the rear end of the drive was lifted off the desk so the cable could reach the USB port.

On the whole, the Samsung SE-506CB isn't a bad external Blu-ray writer. There are a few flaws, but if you can overcome them, then for a slim, portable Blu-ray drive it's worth the £60 price.

Blu-ray Drive

Asus BW-12D1S-U External Drive

DETAILS
- Price: £95
- Manufacturer: Asus
- Website: goo.gl/dP3tN7
- Required spec: USB 2.0/3.0 port, Windows, Linux, Mac, USB enabled TV

Where the traditional manufactures have opted for a classic optical drive design, Asus has decided to go one better when it comes to producing an external Blu-ray drive.

The Asus BW-12D1S-U is a startling looking drive that's close to looking like a nettop computer rather than a dedicated external Blu-ray optical drive. It can handle BD-R/RE/ROM/R (dual layer) and ROM dual-layer read speeds of 8x, DVD R at 16x, DVD RW at 12x and BD-R at 12x, BR-RE at 2x and CD-R at 40x, among others.

This is a USB 3.0/2.0 drive, so when hooked up to the right connection, it performs magnificently. But there's a lot more available in this package than just decent connectivity. Behind the packaging you'll get the drive itself, a small power brick, a USB 3.0 cable – which is a decent length, thankfully – and a suite of CyberLink goodies, which comprise Power2Go 8, PowerDVD 10 with Magic Cinema, PowerBackup 2.5 and InstantBurn 5.

As well as that, you also get a pair of 3D glasses. However, these are the red-and-blue, cardboard-framed variety, so the chances are they won't last very long.

Dodgy 3D glasses aside, the drive is very appealing. The odd, angled design finishes to a blue LED diamond point that conceals the eject button. The chassis can be sat flat horizontally on the rubberised feet or vertically placed in an accompanying cradle with easy access to the USB port, power and the touch-sensitive power switch at the rear. Either way is perfectly fine for the reading and writing of Blu-ray, DVD or CDs.

Accessing the drive took mere seconds, from both a PC and a USB-enabled TV. The content on the Blu-ray disc played without any problems or the kind of bottlenecks you would normally associate with transferring all that data through a USB cable. Even after the tested pause for five minutes, the content sprang back into life within a second or two without any glitching.

Every optical disc we burned succeeded without any coasters being created, and it was done remarkably quickly and without too much noise or vibration.

> **"Accessing the drive took mere seconds, from both a PC and a USB-enabled TV"**

In fact, aside from the disc spinning up, there was very little noise at all, and vibration was virtually nil. The only thing we did discover was that the casing was a little warm to the touch after playing Blu-ray content, and the same can be said for the small power brick too.

The Asus BW-12D1S-U therefore is now our most favourite external Blu-ray drive. Not only does it look very good (a must have aspect for some people who want this on show with their media centre build), but it also performs excellently and offers all the advantages that Blu-ray and Blu-ray 3D media has to offer.

The glasses might be a bit of a joke when compared to the rest of the well-presented package, but on the whole this is a great external drive, regardless of the Blu-ray reading and writing abilities. Mind you, this level of presentation and performance doesn't come cheap.

LG BH16NS40 Internal Drive

DETAILS
- Price: £56
- Manufacturer: LG
- Website: goo.gl/az6MFo
- Required spec: SATA connection, Windows 7 or later

It's hard to believe that LG as a company has been producing consumer electronics since 1959, with its first radio. Obviously these days LG is renowned for the latest model 4K TVs and such, but the company still finds time to produce smaller scale units.

The LG BH16NS40 is a standard 5.25" internal drive that supports write speeds of 16x for BD-R, 2x BD-RE, 6x BD-R/RE (dual layer), 16x DVD-R/+R and 6x for DVD-RW. The read speeds are good too, offering a maximum of 12x for BD-ROM, 16x for DVD and well beyond for CDs.

There's also an interesting edge to this drive as it's compatible, for both reading and writing, with the newer M-disc standard. M-disc, in case you didn't know, is a technology that's added to the Blu-ray standard that makes it resistant to the kind of conditions that usually degrade optical discs. In theory, since the M-disc was tested by the United States Department of Defense, an M-disc will be able to hold onto the data recorded on it for a thousand years. So it's nice to know that embarrassing picture of you on Facebook will last several more generations.

> **"There's a good mix of performance and features with this internal drive"**

Included software comes in the form of the CyberLink Media Suite, which includes PowerProducer, PowerBackup, Power2Go, MediaShow, MediaEspresso, LabelPrint and, of course, PowerDVD 10, which supports all manner of Blu-ray playback including 3D Blu-ray.

Playback was as near perfect as you could imagine. The drive was quiet and started playing within seconds of the disc being inserted. Likewise, after resuming from the five-minute pause, the content restarted without any glitches or stuttering.

The same goes for writing data to Blu-ray, DVD and CD. The noise levels were much quieter than anything else tested so far and as with the last drive, all the media was written to without any problems.

There's a good mix of performance and features with this internal drive. Everything you'll need to get up and running, including fitting it into your PC, is packaged with the drive itself and the software – regardless of whether you like CyberLink or not – is more than adequate for accessing the Blu-ray features, as well as taking advantage of the drive's overall performance.

What's more, this drive can be bought for as little as £56, which is pretty good for a Blu-ray writer of this specification.

To conclude, the LG BH16NS40 is a great internal drive with a lot to offer. The M-disc standard may not be used by everyone, but as a backup media device for important and mission critical data, it's certainly worth considering.

Blu-ray Drive

LG BP40NB30 External USB 2.0 Drive

DETAILS
- Price: £70
- Manufacturer: LG
- Website: goo.gl/oeLOEf
- Required spec: USB 2.0 port, Windows 7 or later

This is the second LG Blu-ray drive we're testing in this group and, considering the last excellent example, we were expecting good things from this sleek-looking desktop unit.

The LG BP40NB30 is a fairly compact unit with read speeds of 6x for all BD standards, with the exception of M-disc, which is 8x, 8x for all DVD standards and 24x for all CD standards. Write speeds for Blu-ray max out at 6x for BD-R, then dropping to 4x for all other Blu-ray standards including M-disc. DVD write performance hits 8x and 6x for DVD-RW, and CD manages to get as high as 24x including CD-RW.

As you can see, the M-disc standard is used on this model as well as the last, which should intrigue those who have adopted that standard as a backup and are looking for an external solution.

There's a special feature on this drive called Silent Play, which reduces the noise levels of reading and writing discs through some rubberised internal padding to key areas of the chassis. On the whole, it works well enough, but it's not as silent as the previously reviewed Asus external drive. The feature also includes a Jamless Play that advertises smooth playback even with damaged discs. Unfortunately, we weren't able to test that, as all our disc were in surprisingly good shape.

Included software is the same CyberLink Media Suite as mentioned in the last LG review.

This is a USB-powered drive and USB 2.0 as well. We've previously mentioned the problems we've come across in the past with regards to USB 2.0 and playing Blu-ray and HD content, and it once again reared its ugly head with this model.

Playback took an age to get going – up to four minutes before the disc in the drive was recognised and started to play. Furthermore, the five-minute pause managed to kill the playback altogether, as well as crashing CyberLink. We eventually had to eject the disc, task kill every instance of CyberLink and then re-insert the disc to have it play. Thankfully, though, CyberLink remembered the stop position and continued from there.

We also never managed to get this model working on the smart TV we were using in the tests. Although the other USB models we'd tried at this point worked, the TV refused to even acknowledge the existence of the LG BP40NB30. This could be an issue with the TV, but since it was too an LG model, we did think it might be down to the firmware on the drive.

Writing media was okay, and all the Blu-ray media had data written to it without any problems, but the DVD and CD discs produced a few coasters.

Although the LG BP40NB30 is a neat little unit, it's not all that good a performer. Basic writing to Blu-ray and M-disc media is fine, but if you're thinking of using this as an external optical drive solution for a media centre, you may want to look elsewhere.

Lenovo 45K1675 Internal Drive

DETAILS
- Price: £130
- Manufacturer: Lenovo
- Website: goo.gl/tcgtiJ
- Required spec: SATA connection, Windows 7 or later

Lenovo isn't the first company that springs to mind when you're considering Blu-ray drive manufacturers. To be honest, this is more of a business buy rather than a home consumer piece of hardware, but it's for sale and available to everyone, so we decided to include it in the group.

The Lenovo 45K1675 is a fairly unassuming standard-sized internal optical drive. Write speeds for Blu-ray discs are 6x for both BD-R and BD-R dual layer, 16x for DVD+R/-R and 40x for CD. Read speeds are 6x for all Blu-ray media, 16x for DVD and 40x for CD.

It may not therefore be the fastest drive available, but it does come with WinDVD and Ulead DVD Movie Factory on a single disc. And it's advertised throughout as being presented in 'business black' – which is just ordinary black to the rest of us.

Playback of Blu-ray content didn't fare too well under WinDVD. The disc we used, *Avengers Assemble*, couldn't be read at all until we installed a copy of AnyDVD. In fact, all the commercial Blu-ray discs bar one failed to run. We first thought that was down to the software, but after installing CyberLink PowerDVD, we soon discovered that the fault appeared to be with the drive and not the installed player.

Interestingly, it's worth noting that it did manage to play commercial DVD titles, both through WinDVD, Windows Media Centre and CyberLink.

Burning media proved to be more successful, with every type of disc being written to without any problems or the creation of coasters. However, the noise levels were terrible, and the vibration from the unit when spinning the disc up, both for reading and writing, was like an unbalanced washing machine.

There is another problem we have this drive, and that was the price. At around £130 this is by far one of the most expensive optical drives we've come across in a fair few years. The price is getting close to that of Blu-ray within the first six months of it being introduced to the PC. £130 is simply ridiculous for a drive this average, especially with the problems we experienced. Even if this is for the business sector, the finance director is better off nipping down to Currys and spending half that amount on a drive that works better and does far more.

We weren't overly enamoured with the Lenovo 45K1675, as you can probably tell. The software isn't up to scratch, the drive didn't play any Blu-ray content, and it sounded awful when in operation. Other than the fact that it writes to media well enough, there aren't any other redeeming feature, aside from the one-year warranty. At least then you can return it.

Even if you were a business and had to stick with certain suppliers, we're sure there are far better options out there available to you.

LG BH16NS40 Internal Drive

If it's an internal Blu-ray writer you're after, then this is the drive to choose. It has everything you could wish for, and it's an excellent performer too.

Ideal for media centres, business machines, backup systems or just as an all-in-one burner for your day-to-day PC.

Asus BW-12D1S-U External Drive

The Asus BW-12D1S-U is a great external Blu-ray writer. If you don't have the room for an internal option, then this will be one to seriously consider.

It looks great, plays everything and performs exceedingly well. The only downside is the high price.

How We Tested

Each Blu-ray drive was tested by being fitted to a PC with an Intel Core i7-4790K, 16GB RAM, Windows 7 64-bit and an Nvidia GTX970 4GB graphics card. We also tested external drives on the same PC, as well as connection to an LG smart TV. Several commercial Blu-ray films were used with the testing, as well as unbranded discs for writing.

	Pioneer BDC-207DBK	Samsung SE-506CB	Asus BW-12D1S-U	LG BH16NS40	LG BP40NB30	Lenovo 45K1675
Price	£46	£60	£95	£56	£70	£130
Internal?	Yes	No	No	Yes	No	Yes
External?	No	Yes	Yes	No	Yes	No
Connection Type	SATA	USB 2.0	USB 3.0	SATA	USB 2.0	SATA
Buffer Size	4MB	2MB	4MB	4MB	4MB	4MN
M-Disc Support	No	No	No	Yes	Yes	No
3D Blu-ray Support	Yes	No	Yes	Yes	Yes	No
Dimensions	148 x 180 x 42.3mm	145 x 20 x 145mm	243 x 165 x 63mm	146 x 41.3 x 165mm	160 x 22 x 153mm	146 x 185 x 41.3
Weight	720g	331g	1160g/1290g with stand	750g	325g	900g

Your Letters

Why Do I Use Linux?

I began experimenting with Linux using SuSE Linux v5.2! After many years of using Microsoft operating systems (I go back as far as DOS v3.0), I find that modern Linux provides me with a much more satisfying, more stable, virus free, and genuinely useful environment than anything that has come out of Redmond! And it's so easy to use!

I am free to set my systems up however I please (or to adopt very usable default options) and have a choice of GUI desktop managers to choose from – which range from the slick and simple (good for low spec PCs) to those providing all of the fancy 3d/ wobbly screen effects that one could wish for on more powerful PCs.

My PCs include a netbook, various laptops, through to a couple of Core 2 Quad based desktop machines. All of them run Linux. I don't have to buy new machines simply to be able to run resource hungry MS Windows OSes.

I dislike the default tile-based desktops that Microsoft now provide and find that Gnome-classic with it's conventional drop down menus to be far more useful. OK, that's a personal choice.

Why do I use Debian Linux?

Because it's possibly the most thoroughly tested and most stable of all the hundreds of Linux "distros". I do try out other distros, usually via VirtualBox, but now rely on Debian for almost all of my computing needs.

I admit to using Windows XP when there are no Linux alternatives (usually because of hardware vendors not releasing information about their products or drivers), but this is now quite rare. eg. Epson and Canon provide Linux drivers for their recent products.

From what I have experienced of Windows 7/8, I have no wish whatsoever to go down that route. I see friends and neighbours having problems, typically with drivers. And who knows what Windows 10 will do?

Installing and configuring a fully working Linux system including most of the application software likely to be needed can be done in approx two hours. Installing a Windows OS along with various third party drivers, anti-virus software and application packages, and registering them, will typically take much longer.

Like David, I like to "keep my brain ticking over" and there are many things deep within Linux that can do that. But for day to day simple stress-free usage, I find Linux provides a more enjoyable, productive, and far more reliable environment than any of the Microsoft alternatives.

Ken Hough

Print Woes

After reading the Group Test of inkjet printers under £50 in your February Special and looking for a replacement printer, I purchased the Canon Pixma MG4250. I can only say I am disappointed. I do not find it intuitive to use and would not recommend it as an office printer. My old HP Photosmart C4280 was easy to use and had a much more versatile OCR function. I have also used an HP Officejet 4620 and found it user-friendly.

Before purchasing the Canon I contacted the company to enquire about OCR and was assured that it was a function within "My Image Garden". With difficulty I can scan to a Notepad file otherwise I am left with a PDF file for which I do not have the facility to edit. I feel this printer may be good for photographic applications but it is not one that I would classify as a good home and office printer.

Elizabeth Topp

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Recovering From Spillages

James Hunt explores your options for when water-related disasters strike

Everyone knows that water and electricity don't mix well, but what does that mean if you spill something on your computer? We've all had near misses with drinks, be they soft or hard, warm or cold, in a bottle, mug, beaker or glass. If it hasn't happened to you already, one day a near miss will turn into a direct hit. But does that mean the end of your hardware, or is there anything else you can do to salvage it?

The good news is that you've always got a chance of sorting your system out. And over the next few pages, we'll tell you everything you need to do to put your waterlogged hardware back on the road to recovery.

Drying Out A Keyboard

This most frequently encountered mishap is, by chance, one of the easiest to deal with. Spilling a drink into a keyboard might ruin your day, but quick action and some painstaking recovery means you can, at least, stop it from ruining your week.

To begin with, your priority is to ensure that the liquid doesn't cause any immediate damage. Disconnect the keyboard from your computer and hold it upright so as much liquid drains away from the surface as possible. The way keyboards are built means it's difficult to get water inside the keyboard itself (it'll probably collect in the key tray), and even if anything does get inside, the large membrane that covers the sensors will probably stop any serious damage from occurring.

Nonetheless, once you've drained out the most immediately accessible liquid, you'll have to take the painstaking step of removing the keys so you can dry underneath them. Prise the keycaps off using a flathead screwdriver or other thin implement and place them to one side. You might want to take a quick photograph of their layout for when the time comes to replace them!

Once the keys are removed, dry out the key-tray. This isn't going to make a huge difference to the keyboard's electrical functionality, but it's hygienic, and if you've just spilt any liquid with sugar in, then it also means you won't sit down at your desk one day to find a parade of ants marching through the office. Plus sticky residue might cause the keys themselves to stick, which would get annoying.

When the key tray is clean, leave the keyboard to air-dry overnight before replacing the caps. This

should allow any water that made it into the interior of the keyboard to evaporate. When you're happy that it's dry, replace the caps according to their original positioning (or not, if you want to see how good your typing is). The keyboard should work normally once you plug it back in. Remember to test every key!

If it doesn't work once you've dried it out, the problem might be that sticky residue made it onto the keyboard circuitry and is shorting out some of the connections. If this happens, your only option (besides buying a replacement) is to disassemble the keyboard and wipe it clean. Unless you have a particularly expensive keyboard, this is almost certainly more hassle than it's worth, but if you want to give it a go, it's essentially the same process as drying out a laptop. Speaking of which…

Drying Out A Laptop

Spilling a drink onto your keyboard might be annoying, but it's even more of a problem when that keyboard also houses the rest of your system's main components. Laptops are great for portability, but that very quality means they're more likely than ever to find themselves on the floor or sofa where drinks might get spilt. And if the worst happens, you have to act fast.

The first thing to do is power down the laptop immediately. Try to do it properly if you can, to avoid the risk of damaging your storage, but it's more important to cut the power quickly than it is to shut it down safely. Usually you can shut the system down quickly by simply holding down the power button. If the AC adaptor is plugged in, remove that first of all, then flip the laptop over and pop out the battery (you may need to disengage a lock lever to get to the battery).

The problem here is that most liquids will conduct electricity and cause the circuits to short, which could produce any number of effects. Hardware damage is possible, and data damage is likely, so you want to get the system to a safe, unpowered state as fast as you can.

“To begin with, your priority is to ensure that the liquid doesn't cause any immediate damage”

The next thing to do is flip the laptop over (assuming it was keyboard-up at the time the spillage occurred). For obvious reasons, you probably shouldn't do this on your carpet, but if you've got a towel or other large washable cloth nearby, that's a good option. If you have any accessories or peripherals attached to the system, remove them as fast as possible.

The idea here is to make sure the liquid cannot travel deeper into the system. The most important and hard-to-access components are located at the base of the laptop, so you must stop the liquid trickling down through it as much as possible. Turning the laptop upside down might mean liquid collects in the keycaps or behind the touchpad, but that's far preferable to having your CPU and RAM drowning in wine.

Once the liquid has had time to drip away from the innards, you may want to tilt it around a bit to pour out anything that remains. Keep the laptop inverted until nothing more is dripping out.

This is where things can get tricky, because you need to get into the interior of the laptop to dry it out. Armed with lint-free cloth and some paper towels, crack open the laptop case and begin to soak up as much liquid as possible. It's best to dab rather than wipe so you don't scratch, dislodge or snap any interior components or circuitry.

If any components are removable, such as the keyboard, RAM and hard drive, you may wish to remove them to check that liquid hasn't gone all the way through into them. If you have to clean the motherboard, remember to remove the CMOS battery – it resembles a large watch

> **Never use a hair dryer or fan heater to dry out a system**

battery and provides a small current to the motherboard at all times. Removing it will delete your BIOS settings, but these shouldn't be hard to autodetect once the system is working again.

Once all obvious visible liquid has been cleaned up, it's a good idea to put the system to one side so it can dry off. Depending on the type of liquid you spilled into your system, you may have to go back in and clean it more once it's dried off – water might evaporate completely with no ill effects, but soft drinks are likely to leave a sticky residue that can still short out circuits, and acid can cause a gradual corrosion which can damage a system over time.

Keep in mind that touching the interior components of your system requires you to have anti-static protection. At the very least, discharge yourself by touching a metal radiator. An electrostatic discharge is just as, if not more, deadly to a system than spillage, and a dry cloth can be a source of static build-up, so be careful. If you're worried, stick to paper towels.

Removing the dried residue can be done in a number of ways. If it's not sticky, compressed air might help. If it is, dab it with a very slightly damp cloth. You can use de-ionised (chemically pure) water or isopropyl alcohol to safely clean circuitry, but try not to let it get into mechanisms such as CD drives and hard drives.

Once the components are clean and all the liquid has been dealt with, let them dry once more, then reassemble the system. When drying a system, it's important not to expose it to direct heat – leave it in a well-ventilated and/or warm room for 24 to 48 hours so any liquid you missed has a chance to evaporate.

If liquid got into the AC adaptor, don't try to dry it out – instead, replace the unit entirely. The high power levels it channels makes it far too great a risk compared to the cost of replacing it.

Never use a hair dryer or fan heater to dry out a system – in addition to blowing dust around your system and possibly melting components, the moving air and dust can cause static build-up, which (as previously discussed) can be incredibly harmful to electrical equipment.

When the system is as clear as possible, only then can you switch it back on. If the equipment is undamaged then it should boot as normal. If not, there's a good chance that the hardware was permanently damaged, and you may have to seek a professional repair job or replacement.

If your system is working again, it's a good idea to create backups in case gradual corrosion causes damage to occur later on. Having your data backed up makes any failure easier to deal with. It's also worth running diagnostics, memory analysis and stress tests to check whether any minor damage has occurred to the system. At least if it has, these procedures should bring it to light before it becomes a problem.

If your system hasn't started working again, it might be worth checking the warranty. Some warranties include provisions for spill damage, though beware that if you've opened the laptop already this might void an otherwise applicable warranty.

Drying Out A Smartphone Or Tablet

The ultra-portable nature of smartphones (and, to an extent, tablets) means they're more vulnerable to water damage than almost any type of hardware. Friends of Micro Mart have managed to drop their phones in the sea while paddling, had them slip out of a pocket directly into the toilet and, in one ill-fated case, managed to place a phone directly into a half-finished

cup of tea while half-asleep in bed. There's no end to the circumstances under which such devices can end up waterlogged.

Smartphones and tablets are just as complex as laptops, but because they're smaller and sealed, there's only so much you can do to dry them yourself. Regardless of what anyone tells you worked for them, don't put your device anywhere near anything too hot like a radiator, hairdryer or (god forbid) an oven. Too much heat risks warping and melting components, while a hairdryer will force moisture deeper inside the system. Instead, follow this simple procedure.

First, as with all waterlogged electronics, deactivate your device immediately. If it's currently charging, pull out the cable. The longer the device is active and wet, the greater the chance of damage occurring. This is the most important step – if you leave it longer than a few seconds, the hardware has a huge chance of being shorted out and permanently damaged, and if that happens, then none of the remaining steps have any chance of working.

Once the power has been cut, dry the exterior as thoroughly as possible. Take out any removable parts, such as the SIM card, battery and any memory cards and dry those too.

Next comes the important step: place the device in a resealable bag along with a desiccant material such as silica gel. You can use rice grains in a pinch, but silica gel is better because it's capable of actively absorbing large amounts of moisture. Remember: do not eat the silica gel. You only need a small amount of silica gel in the bag, but if you're using rice, put as much in as possible. Now seal the bag to ensure that the gel draws the moisture out of the device rather than the environment around it.

Now place the bag in a warm environment and wait. Most advice suggests that you wait at least a day to ensure that the device is fully dried out, but the longer you leave it the better the chance of the moisture being completely dried. Try to rotate its position every few hours just to make sure no water is getting trapped inside. If you're lucky, eventually your phone will be completely dried out, and when you try to turn it back on, everything will be fine. If it doesn't work, put it back in the bag and wait longer. If it doesn't work after three or four days, you're probably out of luck.

The sad part is that even if your phone comes back to life, you run the risk of corrosion further down the line. The chance of this is higher if the water contained sugar, acid or salt, which will eat through circuitry, but a dunk in any liquid will increase the chance of it occurring. Unfortunately, unless you're comfortable opening your phone to give it a thorough clean (something which is more likely to damage the hardware than anything), you'll have to accept this consequence.

It's also worth noting that a dunk of any length will void your warranty. Most mobile devices, especially phones, contain an internal indicator, which changes colour if it comes into contact with liquid. If you submit your phone under warranty, the manufacturer will check this indicator and refuse your request if it has been activated. Annoying, but understandable.

The good thing about these methods is that they're all general enough that they can apply to other hardware too. Anything from a digital camera to a desktop system can be brought back from a watery grave by applying the same techniques. In case it isn't obvious, don't risk drying out PSUs, transformers or other high-voltage electrical equipment – but everything else is fair game. And next time, maybe wait until you're out of the bath before reading that email? **mm**

Alternative Ink

Mark Pickavance explains the options for alternative ink systems and how they can be a doubled-edged sword

Coloured ink for printers is often considered expensive stuff, isn't it?

It irks those who use it that it comes in receptacles that make a thimble seem spacious by comparison and that it is dispensed by the printer in picolitres, yet the cost is mind-numbingly high.

Take, for example, the classic Epson T0713 Durabrite Ultra cartridge that works on about 30 or more of the company's Stylus range of printers. A typical high-street cost is £10.49, and it contains a mere 5.5ml of ink.

A bottle of wine general has 750ml in it, so if a wine bottle contained this ink, it would cost a staggering £1,430.45. Or, put another way, almost the same as a Vintage 1982 bottle of Krug champagne delivered in a hand crafted wooden case.

That's silly, isn't it? I don't really care what exotic chemicals Epson puts in its ink: I will never accept that it makes it worth the same as 30-year old vintage champagne, however Epson chose to brew it.

Of course, you don't need to use official ink, because despite all manner of legal efforts by the major printer brands, you can still get ink from alternative sources.

If you decide to take the path of lowering printer running costs, there are a number of options you have, each having different advantages and drawbacks.

Refillable Carts

When you see how small the cartridges are on most inkjet printers and how rapidly they empty, almost the first thing that crosses your mind is wondering if you could refill them.

There are two problems with doing this: getting the ink in there and the chip that is on each cart that tells the printer how much ink is in it.

You can solve the first problem by drilling a small hole in the top of the cart and injecting third-party ink in using a syringe. It's a messy job, and you need to make sure you block off the hole after filling or the ink will dry out in the cart.

The send part requires a special piece of kit called a chip resetter, which will reprogram the chip to believe that it's new and the cart is unused.

If you do both these things, then you can reuse the cart, maybe even indefinitely if you're careful.

“For those with serious printing needs, you can get ink in one-litre packs for less than £50 a colour, should you intend to run your printer until it completely falls apart”

However, you can make life a bit easier by buying pre-modified carts that are designed specifically for this purpose.

To that end, they have a hole and associated rubber plug that you can remove and replace when you need to fill the cart. That makes the process less prone to leaks, and they also have the chip issues covered too. Refillable carts usually come with special chips that automatically reset themselves each time the printer is turned on, telling the printer that they're full.

That isn't always as helpful as it seems, because you get no feedback about ink left in the system, so you can run out mid-print. But you can refill them almost indefinitely with bulk ink, so the cost advantage over original supplies is substantial.

Where they're not so great a deal is when you do lots of printing, because you'll be refilling on a regular basis, and you'll end up with inky fingers if you don't wear rubber gloves. You can streamline this process by having more than one set of carts, with spares ready to go when you need them, but there are ways to make this less of a chore.

Typically a set of carts for a popular printer type cost around £25, and you can get them usually with an ink starter pack for around £50. Ink costs vary wildly, but a 100ml bottle of a specific colour usually sets you back about £7.50, and it will contain roughly 20 refills for the cost of a single original cart.

For those with serious printing requirements, you can get ink in one-litre packs for less than £50 a colour, should you intend to run your printer until it completely falls apart.

Advantages

- Cheaper ink
- Limited modifications needed to printer.
- Works on almost any printer.

Disadvantages

- Can be a messy job.
- Reset chips don't generally relay ink levels.
- They can leak.

CISS For Heavy Duty Printing

For the hardcore colour print generators, the ultimate solution is to buy and install a CISS (continuous ink system). What this does is replace the internal ink carts with external ones, holding substantially more ink, and it then pipes the ink in through a head that emulates the cartridges.

The advantages of this are numerous, but clearly the possibility of running out of a specific colour part way through a print are massively reduced, if not entirely eliminated.

The makers of the systems don't claim that the ink is a chemical match for that made by Epson, HP, Brother or Canon but that it will work without clogging your printer.

My experience is that while the colours usually aren't generally as strong, the results are usually acceptable given that the ink costs are usually 10% of the branded product.

Once the CISS is on the printer – and for most designs this only takes minutes to achieve – bulk ink can easily be added to the external reservoirs, extending print runs almost indefinitely.

Refilling ink can be a messy job, even if it does save you some money

When you source the technology you need to get one made for your specific printer, and it is worth reading the comments of those who have used the solution provider you've chosen before you purchase.

But (and this is the clincher for many) if you decide you don't like using a CISS or you don't like the ink quality, you can return the printer to normal use very easily, and you can change ink supplier as easily.

That's the good news, but as you probably guessed, it isn't all plain sailing. Depending on your printer, you may have to modify the case to mount the CIS, because most don't have an obvious hole through which all the ink-carrying tubes can easily pass.

On many printers you can get away with leaving the cover open, but if it has a sensor to detect access you may need to disable this micro-switch. Others actually require either extra parts adding or deployment of plastic-cutting power tools.

If that sounds drastic, on what might be a new printer, then a CIS is probably not for you.

There are also other significant hardware issues that you need to be aware of, which are indicative of these printers being designed for a specific lifespan by their makers.

At Epson, Canon and other firms, they build a printer with an idea as to how often it is likely to be used on a monthly basis and over its working life.

Let's imagine (because they don't hand this data out) that a typical consumer inkjet is made to use a set of new carts once a month for five years. What happens if you exceed what number? The printer will refuse to print.

Epson's, for example, have a counter in them that records each print, and once you reach a certain number, the printer will tell you, even if it works perfectly, that parts of the printer have reached their 'end of service life'.

Part of this is true, but it's also a rather backdoor means to get you to buy another printer when the one you have could probably carry on.

The truth is that all inkjet printers pump ink through their heads to clean them or prepare for printing that never ends up on paper. This excess ink is redirected to a foam pad, usually in the base of the printer, where it soaks into the absorbent material.

It's possible to reset the internal counter with a software utility, but once the pad is completely saturated with ink, it will start leaking out of the printer in a generally unhelpful and unpleasant way.

The obvious action would be to replace the pad, though the printer is designed to make this task all but impossible for the owner.

Epson does offer a service where it will switch out the absorbent pads, but the cost for most models is more than purchasing a whole new printer, perversely.

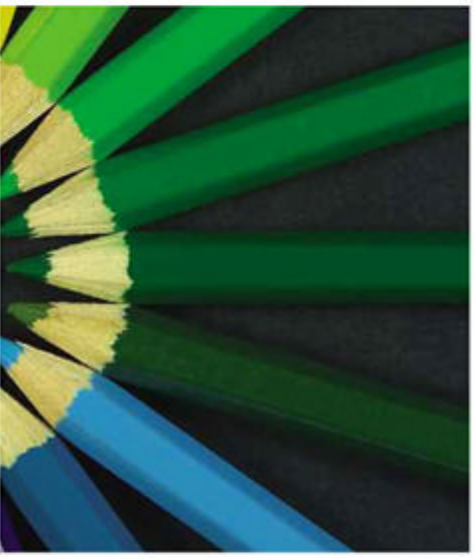
The best home grown solution is to locate the plastic tube that directs unused ink to the pad, and redirect it to an external container which you can then empty when it becomes full. This stops the printer filling with ink, getting heavier, and pouring it away every few months isn't a major problem.

More of an issue is the increasing amount of clutter that a CISS printer generates around it, as the external ink dump is just another item to make space for.

It also makes, along with the external ink tanks, the printer even more challenging to relocate, but it

Branded cartridges are generally well made, allowing them to be refurbished for further use by eco-friendly businesses

"It might theoretically shorten the life of my printer, and the colours might not be perfect, but no mortgage arrangement is required prior to printing"



does solve the printer overflowing with old excess ink.

For those wanting to take this step, a CISS costs about £50-60, depending on the host printer, and ink another £45 or so, depending on how many colours the design uses. Printers with just four colours have generally cheaper CISSs, but you can get ones for those that use seven colours, like the Epson Stylus Pro 4000.

A CISS modification can drastically reduce the cost of printing, but it's not a perfect solution in many respects.

Advantages

- Almost unlimited ink.
- Can be uninstalled.
- Cheapest ink costs.
- Long print runs.

Disadvantages

- Printers aren't designed to work this way.
- Needs physical modifications to printer.
- Voids warranty.
- Accidents can happen.
- Not original ink colours.
- Difficult to move the printer once in place.

"Once the pad is completely saturated with ink it will start leaking out of the printer in a generally unhelpful and unpleasant way"

Third-Party Ink – Is It Any Good?

Before I answer that question, it's worth understanding that the colour accuracy of any ink is entirely dependent on the paper stock you use it on, because when a droplet of ink strikes paper, there's a tiny chemical reaction that can alter the colour it appears to be by the time it fully dries.

Because of that critical element, the colour representation that many printer makers claim is only true if you use their specific paper stock, designed to work with their special ink blends. So unless you intend to use official ink with official paper (and who really does that?), then colour accuracy is probably a moot point from the outset.

And when you realise that cheap photocopy paper can't accept the amount of ink that a heavy gloss stock can, the picture is completely confused even before you introduce non-official ink and non-official paper.

But accepting that we use some good-quality gloss paper and third-party ink, can the results be anything like the official product?

Well, according to numerous tests, in many cases a reputable third-party ink can be as good, with some producing even better and brighter colours than the official products.

That should be qualified by stating that some alternative inks aren't good and don't compare well, but some do, and a small amount of forum research should identify the non-official ink that many customers like and would recommend.

The repost to that sort of statement by the printer makers is that their special inks won't fade over time, and they won't clog your printer, extending its life.

The first part of this assertion is the one with most validity, because cheap inks can fade over a relatively short time if the print is exposed to ultraviolet sunlight every day. However, all inks will eventually fade, because sunlight changes the chemical structure, eventually breaking down the pigment/dye compounds. It also isn't the only factor, because air pollution and ozone levels can also interact, causing other subtle changes.

Therefore the environment a print is kept in (lighting conditions, under glass or exposed, humidity levels) can have an impact on the long-term appearance of a print over time.

And again, inks makes are differently, and some brands have very good fade resistance, at least comparable with official, while some is very poor.

In terms of clogging, the problem comes when you use pigments on printers that were designed for dyes (see Dyes Vs Pigments boxout). But generally reputable ink suppliers won't offer you ink that will clog your nozzles, because they like repeat business.

The one thing that official ink can genuinely claim is that it is consistent, because the printer maker has complete control over the batches of ink it makes.

If you do want to use alternative ink, it's worth doing some research first, trying relatively small amounts and then deciding on a specific supplier and sticking with them once you're happy.

Though not always the case, official ink is often better but not to the degree that it's worth ten times the cost of some perfectly acceptable alternatives.

Cheap ink isn't necessarily poor quality, and branded products aren't always the very best and certainly not the best value.

Refurbs

Though technically not radically different from manufactured third-party ink carts, I thought it was important to mention these, because they're environmentally friendly. Well, as much as anything to do with computers and printing on paper can be, anachronistically.

The appearance of these was first driven by printer makers, who insisted on copyrighting the design of their carts and then wouldn't license anyone to make their own to compete with official ink.

What happens with refurbing is that empty original ink cartridges are collected up, sent to be cleaned out and then refilled like they were in the original factory that made them. This isn't something that is unique to printer ink, as it's often done with laser toner cartridges, where you get a discount by sending your existing empty cart in when ordering a refurbed one.

Are these a viable alternative to branded products? As with most things these days, the term 'that depends' applies here too. How good they are can be very dependent on the quality of the operation, what quality ink they're refilling with and how eco-friendly you want to be.

What you get is the convenience of branded replacements and much lower cost, but no great guarantee about the quality of the product or what it might do inside your printer. Those things said, I've had a branded cartridge fail and dump ink all over

Ink is pumped to a special CISS head that goes where the carts would normally be located

A printer that has been modified with a CISS doesn't look as elegant as it once did, but it prints for much, much longer

the inside of a printer and clog a print head up, so going the official route isn't devoid of risk either.

If you want to use refurbs then find a reputable dealer with a good level of positive customer feedback, and be prepared for the occasional cart that didn't care for a second or third trip around the track.

Final Thoughts

With two of my previous colour printers I implemented alternative ink strategies, but I haven't used a CISS with the current Canon Pixma that I have. It did use refillable carts but got very bored with the mess and being the only person who would do the job of filling them when others wanted to print. For me, continuous ink and refillable cartridges both ended up being more trouble than they're worth.

A major factor in that statement is that I don't print images that often, and when I do, I don't want any hassle getting the printer to work flawlessly.

However, if I was printing every day, I'd seriously consider alternatives, because the cost of using official ink is so high it's just not realistic for any large volume of printing.

My compromise is to use alternative inks in pre-made carts that are much cheaper than the official brand but deliver good enough results that I can live with.

It might theoretically shorten the life of my printer, and the colours might not be perfect, but no mortgage arrangement is required prior to printing.

It's also worth pointing out that even with a CIS or refillable carts, photo service printing is often cheaper per print, especially at the smaller paper sizes.

What's good for the printer owner is that for the most part you can choose the level of cost you're prepared to accept and tailor the solution to fit your budget.

For those who print very rarely, maybe branded carts make sense, although with them often being date controlled, you could get stung with full carts that the system will no longer accept.

CISS solutions are for those who like to print every day and don't want to pay through the nose for the experience. Refillable carts offer low cost as a trade-off against hassle, and third-party cartridges provide the same level of convenience as official ink, but at a fraction of the cost.

Whatever you choose, there isn't anything forcing you to live with that choice, and you can, as I did, reverse course if one option doesn't fit your expectations. **mm**

Dyes Vs Pigments

The ink in printers comes in two distinct types: pigments and dyes. According to those in the print industry, dye offers punchy colours, where pigment is more fade resistant. That's because at a microscopic level the two inks are quite different structurally, with dyes being made of smaller particles that generally soak into paper and pigments being larger ones that coat the surface.

So which is better? Well, that depends which printer brand you use, because different makes have opposing views, and many mix dyes and inks even in the same printer.

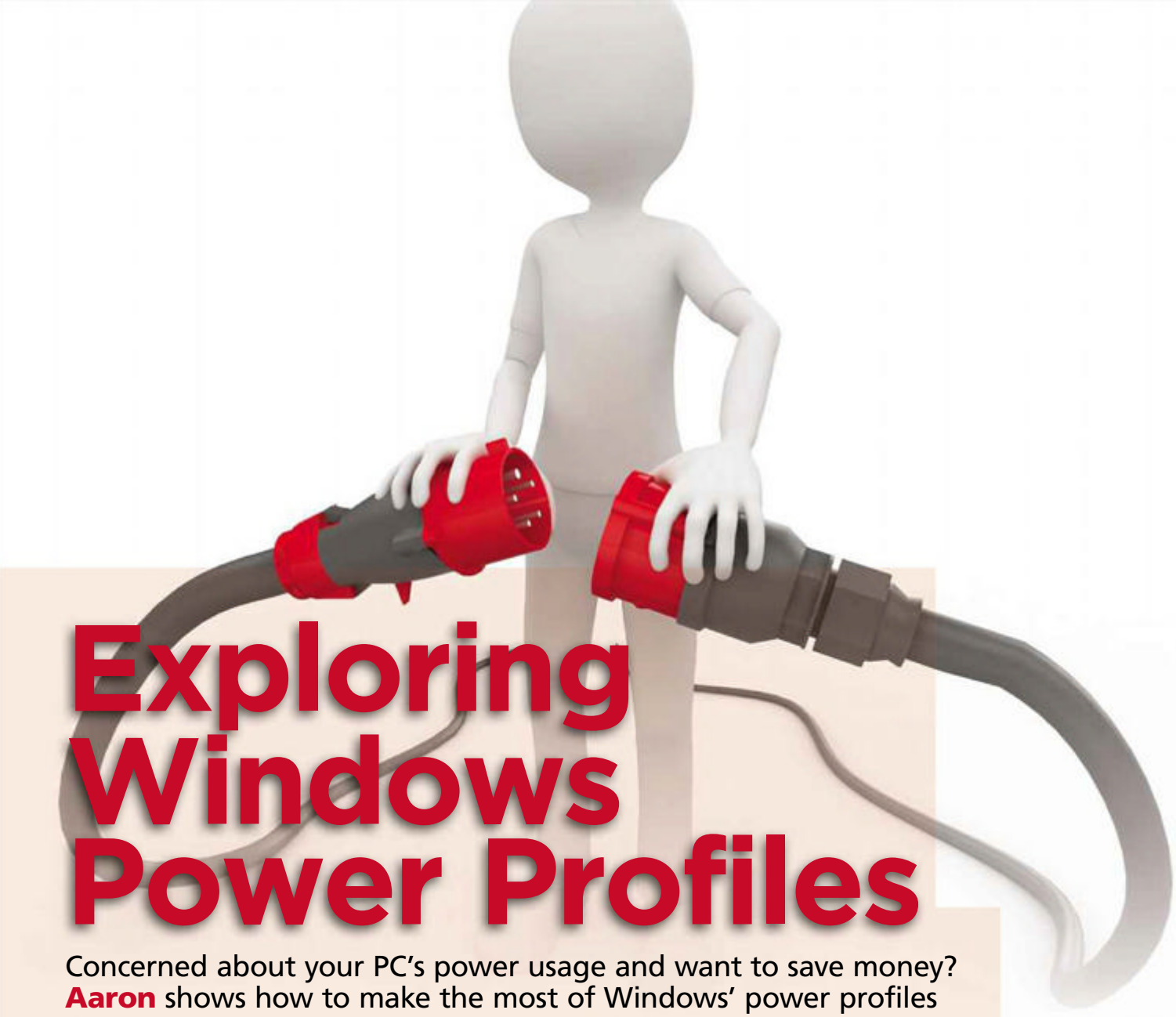
Canon, for example, uses dyes for its photo printing but pigment for printing black text. Epson and HP use all dye inks, and Lexmark is exclusively pigment based.

What those that use dyes do to avoid fading is to make papers that have an ultraviolet resistant coating, which will protect the ink once the dye has soaked below the surface. These coatings aren't unique to the brands, and good third-party photo paper has this level of protection too.

Some paper makers, like the excellent photo paper company Ilford (**www.ilford.com**), actually make specific profiles for their stock based on its performance with specific branded printers.

Ilford also predicts under various conditions how long a print might reasonably last on its paper, which is some of the best available. It's sobering to realise that even Ilford only claims a five-year life for a print placed in a well-lit lobby (2000 lux), printed with original Epson ink, and only a few more years with HP or Canon. However, it predicts the same output would last 40-50 years in an average home.

Pigments might be more fade resistant than dyes, but they're both a long way from being permanent.



Exploring Windows Power Profiles

Concerned about your PC's power usage and want to save money? **Aaron** shows how to make the most of Windows' power profiles

There are many ways to do this, including the use of more energy efficient hardware like green CPUs, but you don't have to spend money to cut down the amount of power you use. Instead, you can make the most of power saving features built into your PC, notably those found within Windows itself.

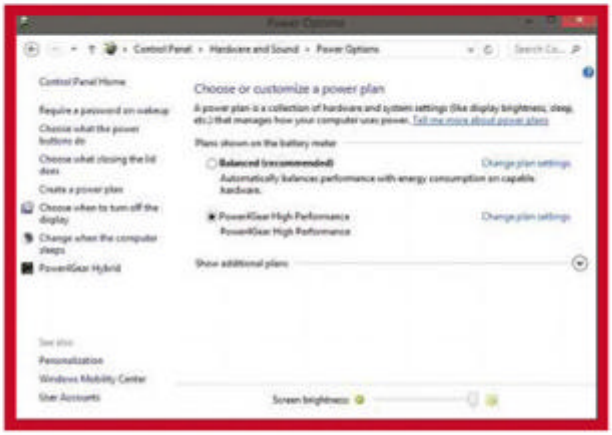
It doesn't matter what type of PC you have; Windows is able to enforce various power saving rules that can help you save energy and these can be very useful in day-to-day usage, as well as specific situations, such as having to leave your PC on overnight to download a large file or run a disk defragmentation procedure. Without such measures, your computer would run constantly, using full power and increasing your energy bill.

For many years Windows has had a sleep/hibernate function, and this is the most basic form of energy saving. After a set time, the PC will go to sleep, leaving programs suspended and allowing you to quickly power up again later. This isn't the only way Windows can help save power, though and advanced power saving schemes can do far more. Let's take a look.

Windows' Power Schemes

Windows' power saving options are easy to find and easy to use, but it's surprising how many people overlook them. They might not be the most in-depth and complex options, but they're perfect for most users who simply need to save a little power or who wish to prolong the life of a laptop battery.

You'll find these sitting within Control Panel, under the Hardware and Sound section. Go into the Power Options section and you'll be greeted with a host of available options. The first you'll see are the main, preset power plans and these may change depending on your system. Some may have their own special entry that utilises specific hardware features. Regardless of



▲ *Windows' power schemes can save a lot of power*

“Windows’ power saving options are easy to find and easy to use, but it’s surprising how many people overlook them”

your options, here you can simply pick one of the preset plans to enable it, with Balanced being the Windows’ recommended option. This is a standard plan that will turn off your display after a while of inactivity (five minutes on battery and 10 on mains power) and put the computer to sleep after a longer period (15 minutes on battery and 30 minutes on mains power). You can also adjust the brightness for laptop displays, as a brighter display uses more power.

These are the default settings in Windows, but like everything else, they can be changed, and for many users, this is a good idea, as there’s no such things as a universal PC setting really. Users and PCs are all different, and so too are the required settings.

To change the plan, you can simply make changes to the times, utilising the drop-down menus and sliders, or to you can take things a little further by clicking on the ‘Change advanced power settings’ option.

This will open up the advanced option window, and in here are all sorts of tweaks that can alter any power scheme. It’s a long list, but it’s not hard to use and understand. Let’s have a look at the options in order and explain what they do. As with a lot of power saving features, there’s a big focus on laptops here, so features for battery power won’t appear when you’re using a desktop system.

It’s also worth noting that some items may be greyed out depending on security and permissions, but you can click the option ‘Change settings that are currently unavailable’ to open them all up.

Require A Password On Wakeup

This is a simple one to begin with and is self explanatory. When set to ‘Yes’, this will instruct Windows to request a password to log back in after the system is woken up.

Hard disk

This option is used to control how long Windows will wait during periods of inactivity before it shuts down the hard disk(s). This is not only good for power saving but helps reduce wear and tear on your hard disks and makes for a silent PC.

Internet Explorer

The setting found in here is for the JavaScript Timer Frequency. This controls the performance level of this web plug-in, as higher performance requires more muscle and thus drains power quickly. Just be aware that you’re trading quality for power saving.

Desktop Background Settings

Windows is able to show desktop wallpapers as an active sideshow, but this image-cycling can use more power, so you have the option to pause this when using battery power.

Wireless Adapter

The power saving mode lets you control the individual power saving mode of the device depending on the system’s main power source.

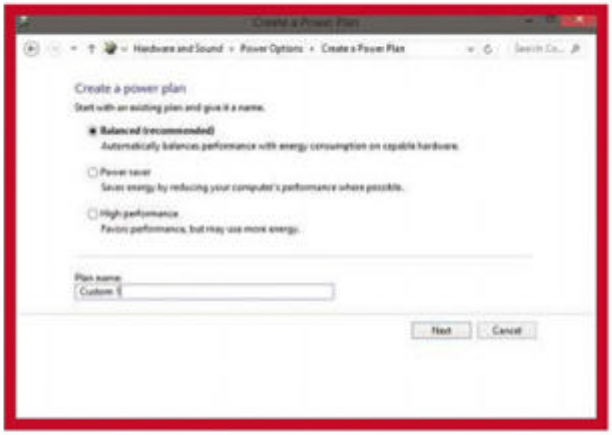
Sleep

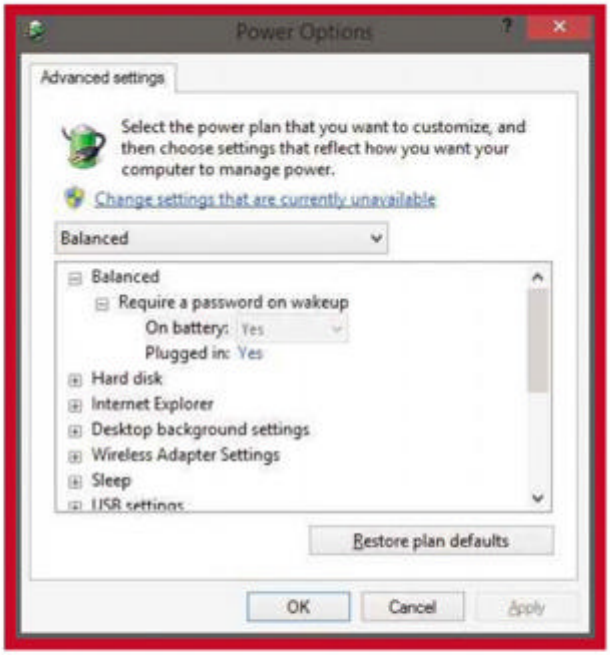
This is one of the most flexible options, and within this section you’ll find various settings that let you control when the system will go to sleep. These include standard sleep, hybrid sleep, hibernate and the option to allow wake-up timers.

USB Settings

This option is used to tell Windows to suspend power to the USB ports using selective suspend. This is of great benefit for laptop users, as it can save power otherwise wasted on the USB ports, but it’s also the cause of some problems. Most notably, this is a possible cause for Windows not recognising plugged-in devices, as the port is disabled. Disabling this can help with this issue.

Creating a custom power scheme is easy





Windows advanced power options give you more control than simple power schemes

Graphics Settings

This option may or may not be present, depending on your system, and it may be different if your PC uses different hardware. For example, a system with an Intel GPU may show an Intel(R) Graphics Settings entry. Whichever you have, this is where you’ll find power scheme options for your graphics hardware. This is important to take a look at, as graphics hardware is among the most power hungry, so plenty of power can be saved here.

Power Buttons And Lid

Again, very focused on laptops, this section controls what happens to the system when the power button is pressed or if the laptop lid is closed.

> **Windows' power saving options are easy to find and easy to use, but it's surprising how many people overlook them**

PCI Express

This lets you control the link state power management option, which controls power to PCIe devices, such as powerful graphics cards.

Processor Power Management

This is another important part of the power scheme, as it controls the power usage of the PC's CPU. Depending on power source and levels, you can control the power the CPU uses, as well as specifying the system cooling policy, changing it from active to passive if on battery power, for example.

Display

For laptops, the system display is one of the most energy-hungry elements, and the bigger the unit's display, the more power it'll use. Using these options, you can control how the system handles the display, altering brightness for specific power levels, using adaptive (automatic) brightness control and simply turning off the display when not needed.

Multimedia Settings

This is an interesting option, as it lets you control if the system can sleep or not, even if it's playing multimedia files. So if you're going to watch a long video, meaning the system won't receive any input for a while and therefore think its idle, you can tell it not to go to sleep when video playback is in process.

Battery

Here you'll find options to control the functionality of the system's battery. You can specify what action is taken when power is at a set level, such as hibernating when it gets too low to prevent data loss and to notify you when this is about to occur. You can also specify the reserve battery level.

That's the built-in advanced options, but that's not all there is to PC power saving, and for even more flexibility you can use third-party tools.

Third-party Power

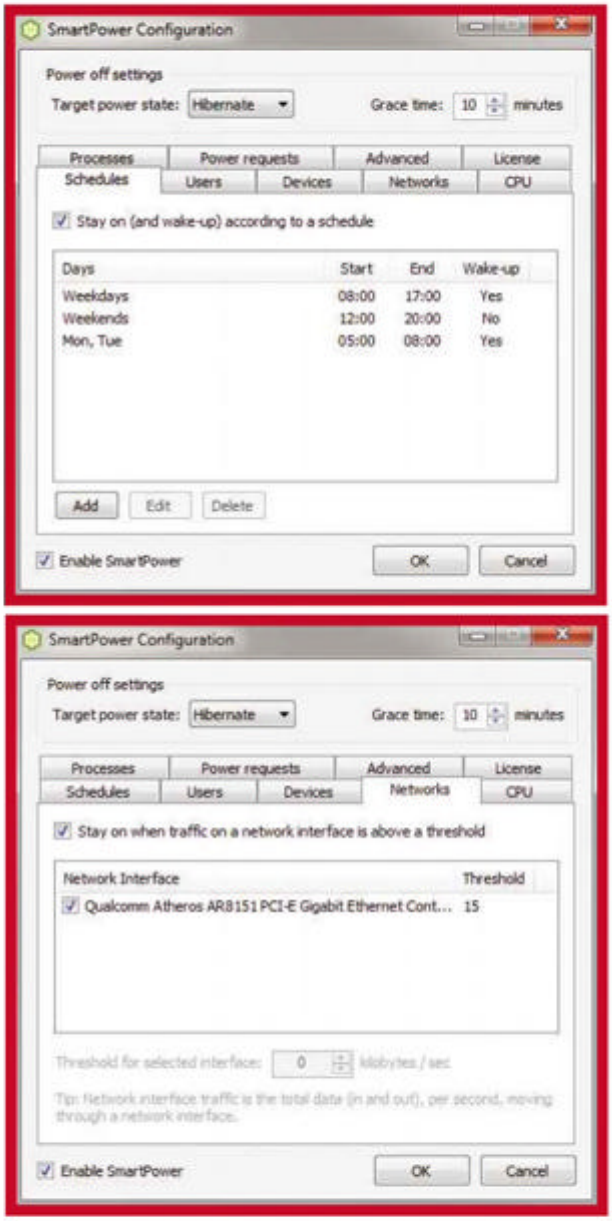
As useful as Windows' own power saving options are, as with anything that's not a dedicated tool, they're also limited, which is where third-party tools can help, and there are plenty to choose from. If you so wish, you can buy a number of tools that'll let you save power using various methods, but you can also get good results from free alternatives.

A great example is SmartPower (**getsmartpower.co.uk**), a tool that lets you take more control over your PC and gives you more options than Windows. The program installs and runs as a Windows service, and using it you can create a custom schedule to suspend, shut down, wake-up and hibernate your PC. This flexibility is enhanced by the option to set up rules and conditions that change how the program works.

For example, you can set up rules for network activity. These monitor activity, and the service will take action depending on the rule, such as shutting down the PC when there's no activity – useful for shutting down your PC overnight after a long download.

Granola (**grano.la**), not to be confused with cereal, is a program more geared towards reducing your PC's overall power consumption. This is achieved by controlling your CPU's power use. The program monitors overall CPU workload and, using an algorithm, it slows down the CPU when full power isn't needed, thus saving energy. It's easy to use and requires little to no configuration. What's more, the program can even display a breakdown of the power you'll save using it, as well as the amount of trees you'll save. Nice.

Sadly, the official site is no longer up and running, as funding



SmartPower is a schedule tool for controlling your PC's shutdown and hibernate

Granola can help trim down your electricity bill

Download Saver

One of the most common reasons you'll want to shut your PC down automatically and not manually is because you need to leave the PC on to download a large file. You might want to set the download off before you go to bed and leave it. Rather than leave the PC on all night, though, it would be nice to have it turn off when the download is done.

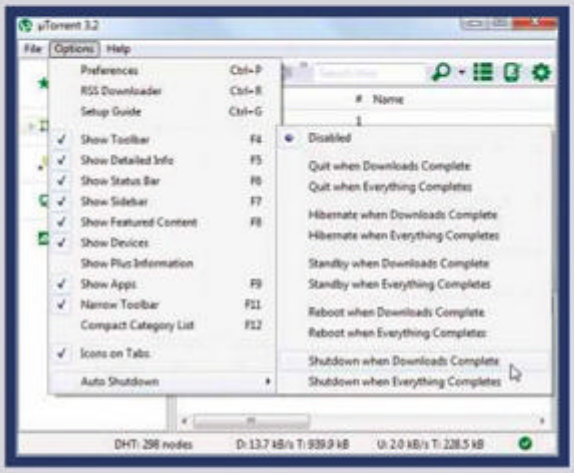
Now, some programs you can download enable this, such as SmartPower, which we've mentioned elsewhere, but you can also use integrated options in various applications you may be using, including download tools.

BitTorrent is a prime example, as this is often used to download large files. Many clients, such as uTorrent, have built-in options for turning off your PC when a download is done. In uTorrent, this option can be found in Options > Preferences > Auto Shutdown.

You can even enter specific commands into each torrent, so different actions are taken. This is useful if you're downloading multiple files, but only one is important, while the others can wait. You can enter a shutdown command into the important torrent, so the machine still shuts down when the download is done, even if others aren't. To do this, right-click on the torrent in question and go into its properties and click the Advanced tab. In the box 'Run this program when the download completes', type 'shutdown,exe /s' and click OK.

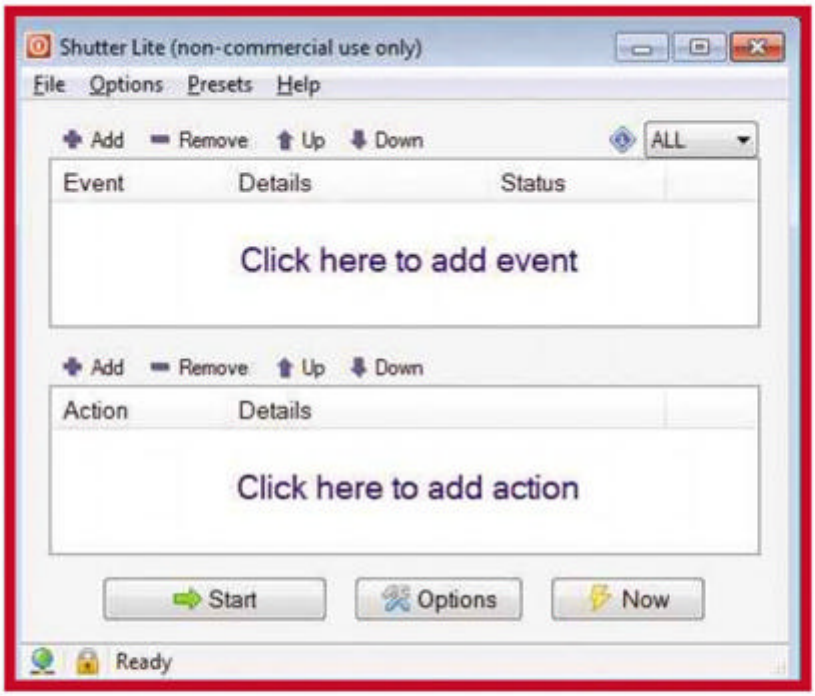
Some browsers can also do this, such as Firefox. Using Shutdown NG you can set Firefox to shut down your PC after all downloads are complete. Other browsers also feature this option, and services like Steam can also be set to shut down your PC when a game download is complete.

Like BitTorrent, you can also shut down your PC after normal browser-based downloads, although you'll need to use a download manager, which are separate tools that handle these browser downloads and are able to resume them if needed, as well as shutting down your PC.



uTorrent is able to shutdown your PC after a download is done

You can control individual downloads in uTorrent, letting them shut down your PC



ShutterLite is able to control your PC's state remotely

issues caused the program's creator to cease development, but you can still download the program from various software download sites.

Finally, we have Shutter Lite (**www.den4b.com**). Like SmartPower, this is another schedule-based power saving tool, and you can use a simple setup procedure to schedule system shutdowns, reboots and other actions. You can also set tasks to run depending on specific activity, such as low CPU use, network activity or battery level. It also includes an online interface that allows you to control a PC's state remotely.

Both Windows and third-party tools can be very useful when saving power, as we've shown here, and it's something every PC or laptop owner should certainly look into, be it to prolong a battery or save money on electricity. So have a look for yourself and make the most of these useful functions. **mm**

ON TRIAL

The Tech That Cost Too Much?

Mark Oakley places some of history's most costly tech in the dock. Were they worth the money?

Ladies and gentlemen of the Micro Mart jury. I come before you to debate some of the most expensive examples of technology's past and present.

In these cash-strapped times, keeping apace with technological advances is becoming increasingly difficult. Every week, an array of new and wonderful gadgets, hardware and software is put before us, tempting us to part with our hard-earned money – and tempting it is. Who wouldn't wish to get their hands on the latest smartphone, a brand new custom-built PC and some of the finest gaming hardware money can buy?

This new technology comes at a cost. I put it to you that sometimes this cost far outweighs the benefits of the products on offer. Throughout the course of the next few pages, I am going to put before you examples of technology that have cost far beyond the realms of what the ordinary citizen can afford. Furthermore, I am going to consider whether or not we can consider these products to have been a commercial and/or critical success, or are these examples of tech that cost too much?

APPLE 1 AUCTIONS PROVE LUCRATIVE

There are, of course, many examples of product releases that cost much more today than they did on their initial release.

The Apple 1 is perhaps the best example. Released in 1976 at the easy-to-remember sum of $666.66, examples of the computer have since gone on to make thousands and thousands of pounds at auction. At a New York auction last year, one original Apple 1 motherboard (complete with keyboard interface and power supply) sold for close to a million dollars at $905,000. Purchased by the Henry Ford museum, which badges itself as bringing "American ideas and innovations to life" this was a record-breaking amount of money.

It's been in good company at similar Apple 1 auctions in recent years. In 2012, another motherboard sold for $374,500, while a working system sold last year for $365,000. History really does count when it comes to such matters.

THE ACCUSED

Apple Watch

The Case For The Prosecution:

I open my case with the Apple Watch, the much-vaunted smart timepiece from Tim Cook and his crew. Recently revealed to the whole world and its dog, I felt that this was a perfect place to begin my argument.

Apple's products are consistently more expensive than similar products sold from other brands. Its raft of iPad tablets and iPod music devices have been priced markedly higher than competing devices, and its iPhones are consistently at the higher end of the pricing spectrum. Clearly, the company has previous form when it comes to a high-priced – possibly overpriced – back catalogue. But with the Apple Watch, it has outdone itself.

The basic Sport version of the Watch costs from £299, which is high in itself compared with offerings from Samsung or Pebble. But consider the most expensive version of the watch, which will set the consumer back a shocking £13,500. The tens of thousands of pounds pays for a yellow/rose gold face but no additional functionality beyond that £299 basic model.

There will be people who will pay this money, who want to be seen as having the money to pay for this in the first place. These are the same kind of people who pay thousands and thousands of pounds on a new sports car or on a smart new suit, just because they can and because they like to stand out from the crowd.

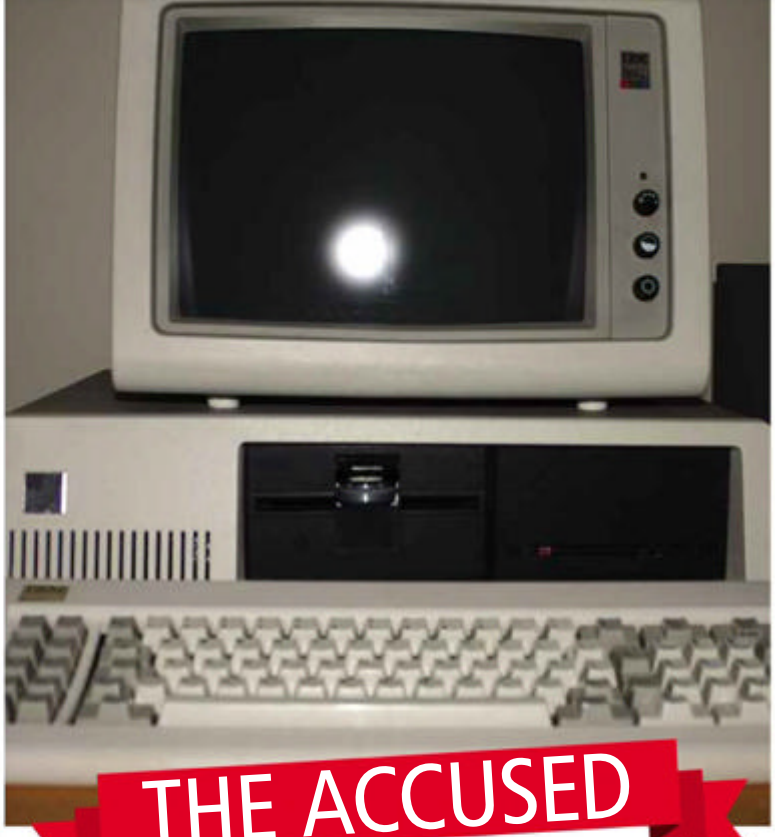
But is it worth it? Can Apple really justify charging such a high price for a watch that offers the same functionality you already have on an iPhone? And you will already own an iPhone if you're buying an Apple Watch, because it needs to be paired with newer versions of the smartphone in order to work fully.

The Apple Watch will undoubtedly help to broaden the smartwatch market. Its release will bring further attention to products from its rivals, and there will surely be a rise in the uptake of devices as a result. But this £13,500 device and the similar £8,000-plus models that you can buy on the Apple website are undeniably overpriced and destined to prove little more than an oddity that will not help the smartwatch market in any way.

VERDICT

GUILTY

Of displaying glitz, glammer and little else



THE ACCUSED

IBM Datamaster PC

The Case For The Prosecution:

In 1981, IBM released its Datamaster PC. According to the IBM archives, this was a system marketed as combining word processing and data processing in a machine "to give small businesses the big benefits of information processing". It came complete with a viewing screen, keyboard and diskette drives all wrapped up in one desktop console.

Designed to be used right out of the box, it came with a choice of two printers and up to 4.4MB of diskette storage. For its time, it was due to be a big release, coming just a month before IBM released its Personal Computer, which did actually change the landscape of the home computer market.

The Datamaster, however, like many systems of the day, was particularly notable for its cost: $9,830. In 1981. By modern standards, the computer would be worth around $25,000. Granted, the Datamaster was marketed more at businesses than individuals, but nearly $10,000 at the start of the 80s? That's expensive. IBM's previous releases to this were expensive too – indeed, the 5120 system that came before it actually cost more, ranging between $9,340 and $23,990. The price of progress...

Systems like the Datamaster were priced too high for serious consideration, and on their own terms failed to take off on a grand scale. The Datamaster was significant, however, in that it (alongside its immediate predecessors) was a precursor to the wildly popular IBM Personal Computer.

VERDICT

GUILTY

Of proving that things weren't always better in the old days

THE ACCUSED
Philips CD-i

The Case For The Prosecution:
You may think that today's next-gen gaming consoles cost a lot, but they're nothing compared to Philips' entry into the home console market.

Philips began work on the CD-i console during the 1980s, but it didn't see the light of day until the next decade. Spin on to 1991, and when the console was released, it was to a general public already used to twiddling their thumbs on the Sega Mega Drive and Nintendo's handheld console the Gameboy.

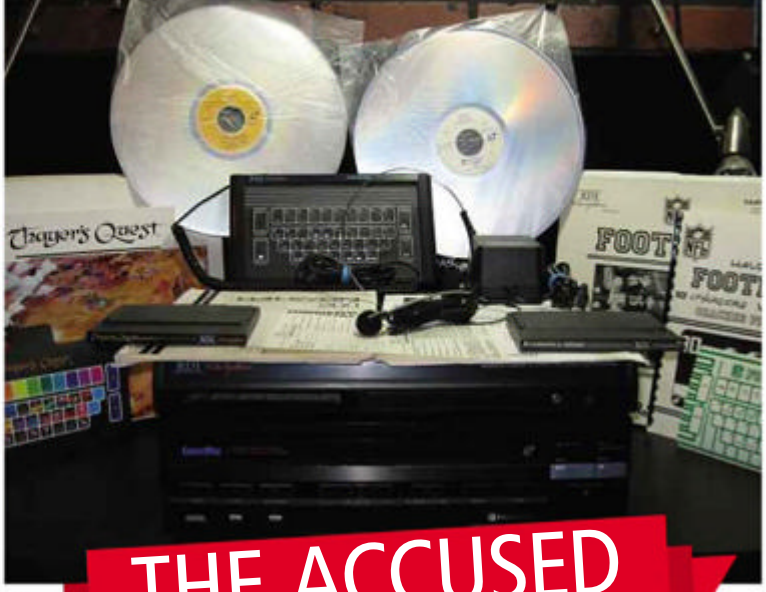
While other consoles of the time were priced in the low hundreds, the CD-i console bucked the trend with a price in the region of $700. Asking for double that of its rivals, the CD-i was marketed as being more than just a gaming console, handling other software plus music. Marketed as an entertainment system rather than a pure gaming system, Philips was ultimately going down the wrong path.

By the time Sony's PSOne was dominating the market, the CD-i's high price, coupled with an underwhelming games catalogue, meant that by 1998 Philips discontinued the console.

Without the specification or games to back it up, there was little justification for its price.

VERDICT

Of failing to understand its consumers



THE ACCUSED
RDI Halcyon

The Case For The Prosecution:
If you think $700 is a lot to pay for a console, what about $2,500? A hunt around the web suggests that the RDI Halcyon cost around that amount and was an utter, abject failure.

Released during the era of Laserdiscs, Laserdisc specialist RDI Video Systems wanted to dip its toe into the console market. In 1985, the company released its RDI Halcyon console that would use Laserdiscs to run the games. The benefit at the time of this console was that the double-layered discs could, in theory, contain a great deal of data.

Released with a voice headset that the gamer could deliver voice commands with, the machine was in many respects ahead of its time. If you have a look for the console on YouTube, there's a fantastic clip of it in action on a US TV show that will give you a better idea of how it all worked.

It was also far, far too expensive. So expensive, in fact, that it was discontinued as RDI itself went bankrupt shortly after the console's release.

VERDICT

Of being so expensive it killed the company behind it

THE ACCUSED
Destiny, Final Fantasy VII And Others

The Case For The Prosecution:
Last year's multi-platform first-person shooter *Destiny* has the distinction of being labelled the most expensive video game of all time.

Costing over a reputed £300m to develop, Destiny came front-loaded with all sorts of hype, much like the Halo sequels before it. Naturally, that hype helped lead to some strong sales. A good job really, as critics' reviews were somewhat lukewarm. The fact is, though, *Destiny* broke UK sales for a new videogames series and similarly sold well all round the world, particularly in the US. It recently picked up a BAFTA for Best Game.

Destiny isn't alone in being a videogame backed by an obscene amount of money. I could name several examples, but let me indulge you with 1997's *Final Fantasy VII*. Heavily backed by a massive marketing effort of around $100m, this was a crazy amount of money to spend back then. The title itself was, in terms of graphics and scope, however, something else. It also proved itself, like *Destiny* and many more major releases since, to be a big seller, clawing the money back in.

VERDICT

By virtue of recouping the money spent on them, and then some

THE ACCUSED
Wearable Technology

The Case For The Prosecution:
When Google Glass was laid to rest earlier this year, it was down to a few reasons. The head of the lab behind the device has recently been quoted in the press as admitting that giving Glass so much hype when it was still in prototype stage was a mistake – more so considering the price on the device was £1,000.

Where Glass failed, Sony hopes to succeed, as it has now launched SmartEyeglass. Again in 'Developer' edition at this stage, this will cost £620 for interested parties. If you've seen Sony's device, it's hard not to be a little disappointed. For £620, I'd want something that looks a lot smarter than a slimmed-down version of cinema's 3D glasses, but perhaps that's just my personal view.

There's also the very real problem of demand – or rather the total lack of it. Products like these cannot justify their high prices, because there are so few genuinely interested consumers willing to put their hands in their pockets. Perhaps the reason for this lies down to the fact that many who would be interested in getting hold of such technology – typically a younger audience – simply don't have the financial means to pay for it. According to research from GfK, the price of wearable technology restricts it to older, more affluent consumers. Perhaps this continues to hold back its growth.

VERDICT **GUILTY** *Of pricing out consumers*

Exhibit A
The Mushroom Flash Drive
Cost: $37,000

This diamond-encrusted luxury flash drive is made by Swiss jewellery maker La Maison Shawish. The drives themselves are shaped like a mushroom and store up to 32GB of data, which is frankly poor. While the website suggests a "Price on application", media reports a few years ago suggested a figure of $37,000 would buy you the highest priced one of these.

Wow.

VERDICT: Guilty (of being too bling)

Exhibit B
The Optimus Popularis Keyboard
Cost: $1,800

The Art Lebedev design studio in Moscow has a history of making expensive keyboards for those who like to show off their riches, and this is as good an example as any. The Optimus Popularis is engineered for any layout, language or symbols – maths functions, special symbols, languages, music notes etc.

Pitched at creative types, you'd surely have to be incredibly rich to justify something like this. It's made from plastic and aluminium, has rubber feet and its key distinguishing design feature is its backlit keys. For the average user, this is never going to be a winner. For professional creatives, though... maybe.

VERDICT: Not guilty (for creatives everywhere)

Closing Statement

I have placed onto the witness stand today several examples from technology's past and present. I hope they illustrate that the technology industry has always been a competitive one. From the days of Spectrum versus Amstrad, to AMD's battles with Intel, and Apple's recent tugs of war with Microsoft and Google, companies want to find a competitive advantage. For established, global companies like Apple, that advantage often translates into higher prices for their goods and services.

The issue of pricing is present throughout the industry. As any system builder knows, you can easily find yourself mentally spending hundreds of pounds on graphics cards, processors, coolers and the rest, all adding up to a PC costing thousands. The industry is, in many respects, geared towards encouraging users – gamers in particular – to spend big when it comes to their next system.

Nobody is forced into paying these prices, and lower-priced alternatives are always available, of course. However, the computer industry is sometimes blind to the realities of the world it services. For an industry that permeates into the vast majority of households across the UK, it's a shame that technology, and computing and gaming in particular, remains a costly pursuit.

Sometimes, these high prices don't match up to the experience either. In the case of the Philips CD-i or RDI Halcyon consoles, both damaged the revenues and reputations of the companies behind them as consumers walked away.

Time will tell for the Apple Watch, but should it follow in the footsteps of Google Glass and other wearable technology that has yet to garner the demand to justify the price, it may just be that this could be a turning point for the industry. **mm**

Remembering...
The Parallel Port

David Hayward talks about his favourite connection on the back of a PC

Long before we had these new-fangled USB connections, there were just two choices for hooking up a printer or scanner to your PC: serial and parallel. (Of course, there are three if you include networking.)

Serial was a small, nine-pin port (mostly, although there were other examples) that looked very much like a VGA port, which is why being a techie in the 90s you often found someone complaining of a faulty monitor with the PC end of the VGA cable plugged into the serial port.

Parallel, on the other hand, was unmistakable. With its long, often purple-coloured, 25-pin port taking up the majority of space on the rear of the PC, there was something reliably solid and reassuring about it. How often have we been asked 'Where does the printer plug into?' and answered with, 'The only place that connection is going to fit!'?

The parallel port was king, and it allowed us to connect not just printers but also scanners, external drives, modems, weather stations, those weird-looking devices that allowed you to program chips and boot ROMs, software DRM-like protection as dongles. And, of course, with help from the saviour of the PC technician, Laplink, we could connect two PCs and send files to and from each.

Its History

The parallel port was developed in 1970 by a group of people who worked at Centronics – hence why it was also known as a Centronics Port. Dr An Wang, Robert Howard and Prentice Robinson developed the parallel port standard as a means to connect their new line of printers, calculators, VAX systems and the like.

Later, IBM started to use the port as the standard on its PCs, but with some small differences to better cope with emerging printers and other peripherals. The 25-pin port on the PC side was then married to the 36-pin unique connector on the opposite end of the cable and thus became the PC-to-printer cable that could send 8-bits of data parallel to each other, to a maximum speed of around 100KB per second.

As the peripherals being attached to PCs became more powerful and the need for greater speeds with a higher level of stability was the norm, HP then improved the parallel connection and introduced a bidirectional standard in the early 90s.

The parallel port surprisingly lasted for quite some time before being put to rest by the introduction of USB in the mid to late 90s. But even though USB was faster, cheaper and made a better connection, the parallel port was still a regular on the backs of motherboards for many more years.

These days you'll be lucky to find a motherboard with a parallel port. Usually there's a parallel-to-USB connection somewhere along the line, or you could pick up a PCI parallel port card from a specialist supplier.

Did You Know...

- Pin 1 carries the strobe signal. It maintains a level of between 2.8V and 5V but drops below 0.5V whenever the computer sends a byte of data. This drop in voltage tells the printer that data is being sent.
- The Enhanced Parallel Port (EPP) could transmit data at an astounding maximum of 2MB per second.
- We once saw a device that was hooked up to a nuclear submarine (we don't know what it was doing), via a parallel port on a PC.
- At that same shipyard, there was also a huge CNC machine making armour plating for tanks hooked up via a parallel port. Fascinating stuff.
- We made a rope swing out of old Centronics cables once. It's probably still there today!

The Good

Being able to find the port in the dark, under a desk, while holding your breathe to prevent inhaling clouds of dust.

Wonderful Laplink speeds and a solid connection for whatever it was you were running.

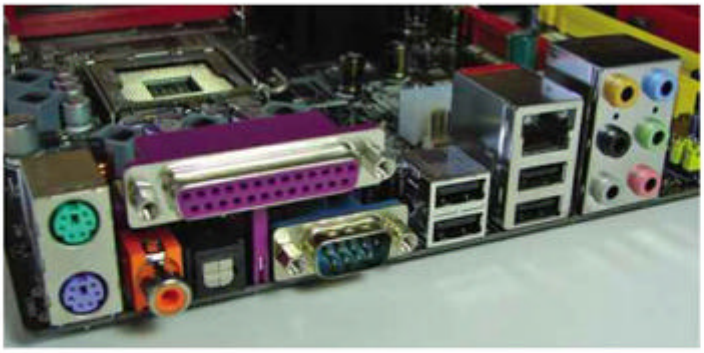
The Bad

Big cables – very big, chunky, heavy and painful when they land on your head from the around the back of a desk.

Someone trying to hook up a printer remotely using someone else's dodgy home-made parallel cable.

Conclusion

The parallel port brought us the kinds of connectivity, including multiplayer games, that you could only manage in a network. And remember, this was before we had home networks, routers and all that modern stuff.



There she is, the parallel port, in all her purpley goodness

These days, a parallel port is usually relegated to being a PCI card connection

The Things That Frustrate Us About... Snapchat

No longer controversial, Snapchat's just another messaging service now... and we're annoyed with it

When Snapchat was launched, it grabbed a load of headlines because, well, there are some fairly obvious uses for a service that let you send photos that disappeared after a few seconds. Now the excitement's died down a bit, Snapchat's become another one of those everyday tools we use for chatting to friends. If you want to show someone something quickly, it's much easier to send someone a quick snap than to attach a photo to an email, or pay MMS charges for sending a picture via text. It means you don't have to clog up someone's phone or email inbox with photos of your outfit or dinner, too, which is a bonus!

Just because Snapchat's quite handy doesn't doesn't mean it's not really irritating sometimes. Here are three of our main gripes:

Argh! So Many Ads!

Public relations types were quick to see that Snapchat could be used in media campaigns, and some companies have managed to use it in interesting ways, sending out early promotional images from new films or mini videos promoting their new products. While that kind of stuff is fun when you actively choose to follow a corporate account, it can be really annoying when you get notifications from the app for advertising you're totally uninterested in. When you're scrolling through the Recent Updates section, do you really want to see snaps from 'Los Angeles Life', even though you live in Bristol?

Fix it: Adverts are a necessary evil, we know, especially where free services are concerned. It won't stop us whinging, though.

Bah! No Screenshots

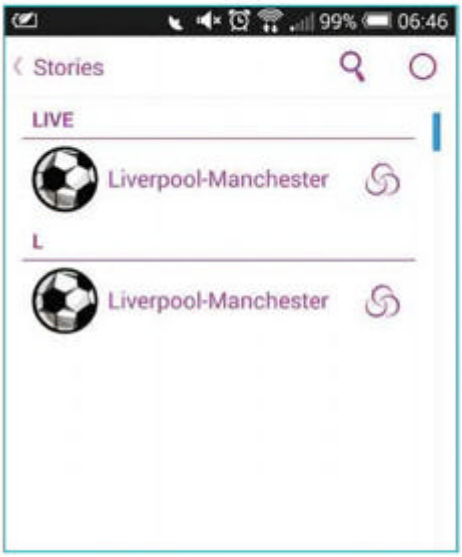
Yes, we know you can take screenshots of Snapchat images – assuming you're quick and have nimble fingers, and don't mind the sender knowing you've done it – but that's not what we're talking about here. Nope, what's annoying is that you can't use Snapchat to send screenshots. It might not sound like a big deal, and okay, it isn't, but haven't you ever wanted to quickly share an odd headline or an embarrassing tweet with someone? Being able to fire off a quick screenshot via Snapchat would be kind of useful in the same way sending someone a snap of, well... anything else, already is.

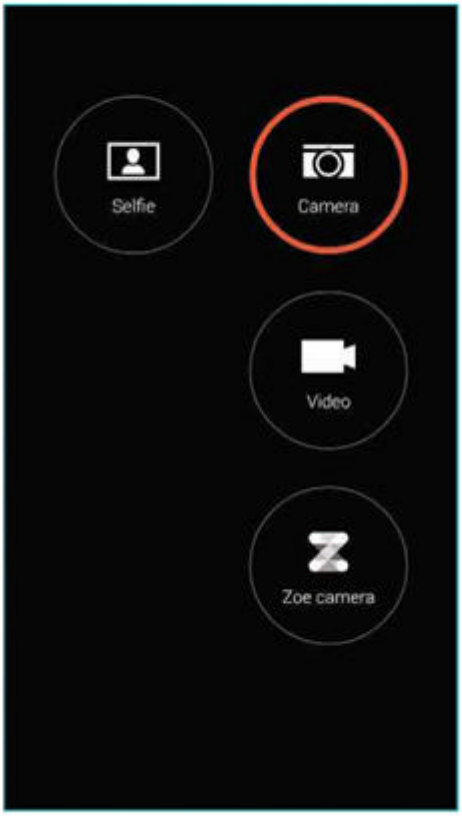
Fix it: There's nothing you can do about this but resort to other ways of sending photos, sadly. Back to sending emails, then!

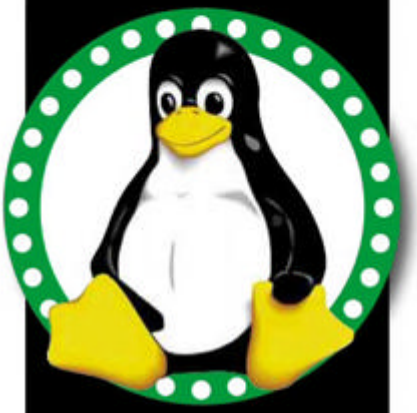
D'oh! Fumbling Fingers

You have to keep your finger on the screen to see a photo in Snapchat. That's kind of the point, to make it harder to take a screenshot or share an image with anyone else; it's a privacy feature, rather than a bug. The fact it's intentional doesn't stop is being annoying when you're the kind of clumsy that drops your phone six times a day. It's very easy to completely miss seeing a snap at all because you just fumbled with your phone for a couple of seconds.

Fix it: Probably can't blame this one on Snapchat. This is one of those 'taking responsibility' things. Bah! **mm**







Ubuntu Isn't All That Bad

One user's first impressions of Ubuntu

David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Recently I was asked by a friend to help them install Linux on a spare laptop, as they fancied seeing what all the fuss over a non-Windows operating system was about.

Naturally, I asked her what she planned doing with the install. Did she just want it for normal, computing duties, while dipping her toe into the world of Linux? Or did she want to go all out and test Linux to its extremes?

She came up with a few suggestions, as did I, but then she announced that she wanted to have Ubuntu installed. After asking her if she was absolutely sure, I caved in and I showed her how to install Ubuntu 14.10 on to her laptop.

Unity

As Ubuntu booted into Linux, post-installation, we were greeted with the familiar colouring and setup of Unity. "Wow," was the first impression from our new Linux user. "It's not what I expected it to be."

You see, she told me, she imagined Linux, or Ubuntu in particular, to look like something from the 80s. Like some kind of DOS shell, that you could have option of booting into a GUI with. I did tell that you can have that for any distro, but some do operate like that by default.

But where I was thinking a GUI, like a proper windowed, modern interface, she had pictured something along the lines of DOSShell. So when she first saw Unity boot up, with its easy-on-the-eyes scheme, modern search technology and that quick launch bar down the side of the screen she was, to quote her, "well impressed".

This made me stop for a moment and think. I always liked Ubuntu before it adopted Unity and, to be honest, I quite enjoyed the first few editions of the desktop with Unity. But when Gnome 3 had caught up, along with Cinnamon, MATE and all the other environments, I tired very quickly of Unity.

The new installation, and being with someone who hadn't seen an operating system other than Windows, also made me realise that Ubuntu isn't all that bad.

Out of the box, everything on her laptop worked, it was quick, stable and it looked pretty good too. All in all, it's what an operating system should be. Comfortable, speedy and, above all else, easy to use.

I Can See Me Using This...

After a while my friend declared that she liked Linux, or rather Ubuntu, and that she could easily see herself using the installation for her uni work, personal browsing and anything else she decided to do with it. Another convert, then?

We'll have to see if she sticks with it. While I'm not in the job of trying to convert the world to Linux, it's good to see that open-source operating systems have improved to the point where even a completely new user can get along with it immediately. The question, of course, is whether she'll be able to stay with it long-term, especially coming from Windows, which does still tend to be a more streamlined and intuitive experience. Time will, no doubt, tell.

Ubuntu isn't for everyone, but it makes a decent stab at being accessible

MacBook UnfAir

Apple's released a new MacBook, and people with short memories are moaning like mad

I remember when the original iMac was released, and the entire tech industry lost its collective mind. From the Apple camp, there were claims Apple had betrayed its users. In throwing in its lot with USB and ditching its own connectors (then something relatively few PC manufacturers had so wholeheartedly done), people were forced to – shock! – move on. Even worse, it had no floppy drive! Imagine a world in which a PC has no floppy drive! You can't, because it's unthinkable!

At least it was, until you realised that the last time you'd used a floppy drive on the Mac was in fact several years previously, to load some rubbish demo off of a magazine covermount, and that all those covermounts were busily moving to shiny discs anyway.

Fast forward a bit to the MacBook Air. It's 2008, and Steve Jobs pulls the thing out of a manilla envelope on stage. It's a statement. Portability. Thinness. Simplicity. Elegance. But wait! As much as the device shed grams (or pounds, old-school unit fans), it also shed lots of other things. Obviously, there was no floppy drive, but now the DVD drive was also being consigned to history, despite everyone knowing DVDs would be around forever. Also, there was only a single USB port and a micro-DVI, making it literally impossible to use your existing peripherals with it simultaneously. Unless you bought a hub. Or favoured wireless. BUT ANYWAY.

Naturally, the iMac and MacBook Air were both huge failures that taught Apple a valuable lesson. All they managed to do was sell like hot cakes and entirely reconfigure the rest of the industry, which rapidly clamoured to awkwardly add semi-transparent blue panels to beige PCs or to make their own notebooks insanely thin, to the point they'd give you a pretty nasty paper cut if you got a bit careless.

All of which brings us neatly to the new MacBook. It's the thinnest Mac ever, with a brand-new keyboard design, force-touch trackpad, Retina display, and surprisingly excellent battery life. Sounds pretty good if you're a Mac fan, right? Wrong, you total buffoon, because what Apple fans like to do more than anything is complain about how terribly unfair Apple is when Apple does something very Apple-like that it's only done several times quite recently.

This time, it's more like watching a repeat than an evolution, given that, again, we're seeing a super-skinny laptop with only a single port. Only this one's USB-C, so that's really got everyone's knickers in a twist, given that all their current USB things lying around don't have that connector.

Of course, there's nothing to be done about this. Ignoring all the other laptops introducing USB-C, Android manufacturers saying they might start using it for charging, the reversible plug, the way in which it can transfer data really rapidly and that USB-C can be used for video output, it's clearly a dead-end technology. If we somehow gloss over the likelihood that USB-C will rapidly appear on every other Apple hardware refresh, it's clear the company's made a huge error and hates every one of its customers. And if we pretend that wi-fi, adaptors, hubs and, indeed, other apple notebooks with a wider range of ports don't exist, it's clear Apple's betrayed its entire audience once again. After all, you're now legally obliged to buy a new MacBook whether you want one or not, just like you were with the MacBook Air and the original iMac.

What a monster Apple has become.

Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find **Craig** on Twitter at **@craiggrannell**

Nintendoes Mobiles?

Ian McGurren reports live from hell, where it to be freezing over...

Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

It's something that's been bandied around for many years by the gaming community: should Nintendo develop for mobiles? Yes, say many; the 3DS technically pales in comparison to modern mobile devices (and it may not be long before the Wii U is eclipsed too), and Nintendo has such a vast treasure of intellectual property to draw on that Mario on the move can only be a good thing. However, as there are those who say yes, there are just as many who decry any move towards what they see as a kind of second tier of gaming. Do we really want such treasured characters, such as Donkey Kong, reduced to endless runners propped up with in-app purchases? Take Sega's less that impressive range of mobile games, often doing not much more than besmirching the good past of their maker's name. Look as well to when Nintendo leased its IPs for Philip's CDi system, resulting in what are roundly considered the very worst uses of Zelda and Mario ever put to machine code.

However, Nintendo has announced that, along with a new system, mobile gaming is to be embraced. It isn't clear in what manner, whether a version of Nintendo's Virtual Console will be made mobile or if this is purely related to the nature in which the new device works (a mobile-cum-home console has been suggested). What if we even see HD-style remakes of some older games? Which would work on a device with no matching physical controls?

The Legend of Zelda: The Phantom Hourglass / Spirit Tracks

Released in 2007 and 2009, these two DS-exclusive Zelda games kept the divisive cel-shaded art style first debuted in the preceding *Wind Waker* on GameCube. Essentially still the same town/dungeon/tow/side quest/dungeon format as most other Zelda titles, both games differed from the rest in terms of controls – both purely made use of the DS's stylus for all aspects. In turn this means that on mobile, the games would work perfectly well, especially if a split-screen layout is used. Zelda isn't quite set up for bite-sized, pick-up-and-put-down gaming, though.
Would it work? Yes, if a suspend feature is added.
Will it happen? Unlikely – it's too big.

Professor Layton

Another DS debutant, the Professor Layton series concerns the everyday tales of a man in a stovepipe hat and his boy sidekick, solving mysteries through fiendish puzzles. Although each game is much the same, bar their location and underlying story, the Professor Layton series has been a huge success across a wide demographic. Like Zelda, they're fully controlled by the stylus and, helpfully they're also set up for bite-size chunks of gameplay too. More importantly, maker Level-5 has already put out a mobile title from the same universe in 2013's *Layton Brothers*.
Would it work? It already has.
Will it happen? It already has, kind of...

Pokemon

If there is any system seller that resides outside of Nintendo's core properties, it is without a doubt, Pokémon, the world's favourite monster collecting / trading / fighting simulator. Owned by Nintendo but made by Game Freak, currently if you want to play Pokémon, then it's on a Nintendo system only. However, as the majority of the core gameplay in the games is controlled by a few buttons, touchscreen interaction would be possible. It's also one of the few franchises where in-app purchases or at least integration with Pokémon trading cards, would make sense.
Would it work? Definitely
Will it happen? Depends if Nintendo likes earning more money than sand on the planet.

Nintendo's possible entry into the mobile gaming world could be a watershed moment, one where the format gains credibility and Nintendo catches up with the rest of the world. We could see some truly innovative and exciting games from Kyoto. But then we may also just see Mario turn up as a playable character in an obscure pachinko or mahjong game. With Nintendo, you really never know...

Nintendo®

Epic Power, Tiny Price

AMD's gaming leviathan has halved in price in a year, making it a real bargain

I know Component Mart is the column for sourcing bargain bits, but I can't let this column go without mentioning an absolute bargain that you'd be daft to pass up. The bargain in question is the pant-wettingly superb AMD Radeon R9 295X2, a single board created by the high-energy fusion of two Radeon R9 290X graphics processors (GPUs) and 8GBs of graphics RAM to create one immensely powerful graphics card. A card so powerful that you'll need a power supply rated in excess of 1,000 watts to power it, and possibly a domestic generator if your significant others already object to the effect your system has on the household electricity bill.

You'll also need to find a home in your case for a radiator and fan, because the R9 295X2 needs liquid cooling to keep it running in tip-top condition. The liquid cooling system is in addition to a large centrally located fan. However, the liquid cooling is no bad thing, because it keeps the card wonderfully silent, the key benefit being a tranquil gaming environment. At its loudest, it's like sitting next to a fish tank, which is pleasant but could prove too relaxing in the heat of a frantic pitched battle in the latest FPS game.

The Radeon R9 295X2 is powered by 5,632 stream processors split between the two GPUs. Although the R9 295X2 has 8GB of graphics RAM, it's also split between the two GPUs. Even so, that's still a decent amount of memory, and I had no trouble running the graphically tough *Crysis 3* when I reviewed it last year. With *Crysis 3* running at 1920 x 1080 with Ultra quality graphics and 4x anti-aliasing, our 295X2-equipped system provided a maximum frame rate of 104fps and an average of 72.6fps. Even at Ultra HD (3840 x 2160) with High quality graphics and 4x anti-aliasing, the system produced an average frame -ate of 42.2fps and a 28.4 average frame-rate with Very High quality graphics. Those results are all at stock speeds too, so you should be able to get higher average frame-rates with a bit of overclocking.

The Radeon R9 295X2 is now available at the bargain price of £500, with Overclockers UK (**tinyurl.com/qf9ohfx**) selling a Sapphire-branded version and Scan (**tinyurl.com/ohrlkqf**) selling an MSI-branded card. Considering the R9 295X2 was a great card at £1,000 when I reviewed it last year, this £500 price makes the card astonishingly good value. Whether it's the challenge from Nvidia in the form of its second-generation Maxwell-based cards that has prompted the price reduction or the need to shift stock before a new release, this new lower price is not something to be ignored. If you have a power supply big enough to power it and you love games, you should check out the AMD Radeon R9 295X2.

Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Twisted Metal

Metal Gear Solid 5: The Phantom Pain will, it seems, be creator Hideo Kojima's last, following an apparent parting with publisher Konami

This week, Ryan looks at Hideo Kojima's apparent rift with Konami in the run-up to The Phantom Pain's launch, and checks out Diablo III's latest developments...

Plug & Play

Game designers with true celebrity status are almost nonexistent, but Hideo Kojima certainly comes close. The auteur behind the *Metal Gear* series since its inception in the late 1980s, he's steered the hugely popular stealth franchise through successive hardware generations. These days, the *Metal Gear* games are as known for their cinematic sense of scale, detailed world-building and unfeasibly long cut-scenes as their stealth mechanics – and as if there were any question as to Kojima's personal stamp on the franchise, the words, "A Hideo Kojima Game" have appeared on boxes and advertising for at least the past decade.

Behind the scenes at publisher Konami, however, relations appear to have become somewhat strained. On the 19th March, it was noticed that Kojima's name, and any trace of his studio Kojima Productions, had disappeared from advertising and artwork for the forthcoming *Metal Gear Solid 5: The Phantom Pain*. At more or less the same time, Kojima Productions' Twitter account had its name changed to **@MetalGear_En**.

The changes coincided with a corporate reshuffle at Konami, which also saw Kojima's name abruptly dropped from its list of executives. Then came rumours, courtesy of *Gamespot*, that Konami had suffered a major falling out with Kojima Productions, with the latter's key staff being given "restricted access to corporate internet, emails and phone calls."

Gamespot's anonymous source went on to state that, once *Metal Gear Solid 5* launches, Kojima Productions will essentially be disbanded, and Kojima will leave Konami. While the publisher didn't respond directly to these rumours, a joint statement released on the 20th March appears to confirm that, after this year's sequel, Kojima's involvement with *Metal Gear* is essentially over.

"I want to reassure fans that I am 100 percent involved and will continue working on Metal Gear Solid V," Kojima states. But the same release then adds, "Konami [...] will continue to develop and distribute top-quality content in the *Metal Gear* series following [*Metal Gear Solid 5*]. As the next step in the series, Konami has already resolved to develop a new *Metal Gear* title. We will be conducting interviews for main staff to lead the development."

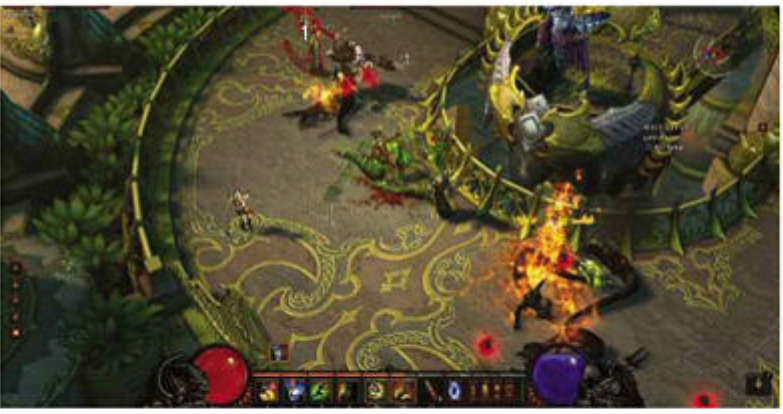
Before this drama unfolded, Kojima had already said that *The Phantom Pain* would be his final game in the series – though, as he'd said that so often during the creation of previous entries, few (ourselves included) took his words seriously. Did Kojima fall out with the publisher over the direction the *Metal Gear* series should take? Whatever the reasons for the Kojima-Konami rift, it seems clear that the designer's involvement with his most famous creation is now officially over. *Metal Gear* will continue, but for the franchise's fans, it's the end of an era.

We'll finally get to see Kojima's MSG swansong when *Metal Gear Solid 5: The Phantom Pain* is out on the 1st September.

Online

When *Diablo III* finally launched in the spring of 2012 – marking the end of more than a decade of planning, development and feverish anticipation from fans – it's fair to say that it wasn't all plain sailing for Blizzard. Some design decisions were controversial to say the least,

Diablo III's director Josh Mosqueira has admitted that auction houses "sabotaged" the game's loot-grabbing balance. Meanwhile, the game's third season begins on the 10th April



not least its auction houses, one of which allowed players to exchange real-world cash for in-game items. That aspect of the game was unpopular among Diablo users before released, and remained so afterwards - right up until Blizzard finally boarded the auction houses up in March 2014.

Recently speaking to **Gamesindustry.biz**, *Diablo III* game director Josh Mosqueira was candid about some of those design decisions; the auction houses, he admitted, had affected the game's balance more than he or his colleagues had anticipated.

"We realised we fundamentally sabotaged what is inherently awesome about *Diablo*, which is killing a monster and getting the loot," Mosqueira said. "And so looking back I think it was a good thing we did it, mostly because we realised at the end of the day any decision that compromises the integrity of our game is one that we cannot allow to happen."

Diablo III's last expansion appeared last March, but Blizzard have still been providing new content to keep players interested. Each season, as Blizzard calls them, has provided a fresh set of challenges and items to scoop up, and it was recently announced that *Diablo III*'s second season will draw to a close on April 5th. However, just five days after that, on the 10th of April, season three will kick in. Fear not, though: pretty much all your progress and gear will roll over to the third season, except for Conquests, which will end with season two. The five-day gap between seasons two and three will give players time to "sort through your rollover rewards and review your progress on the leaderboards" – and maybe buy a new mouse after all that frantic clicking.

As for the next, full-blown *Diablo III* expansion, there are rumours that something major will be announced at this autumn's BlizzCon – though we'll have to wait and see whether it'll be something as meaty as an expansion or merely some additional downloadable content.

You can find out more about *Diablo III*'s second and third seasons at **blizz.ly/10ihe4P**.

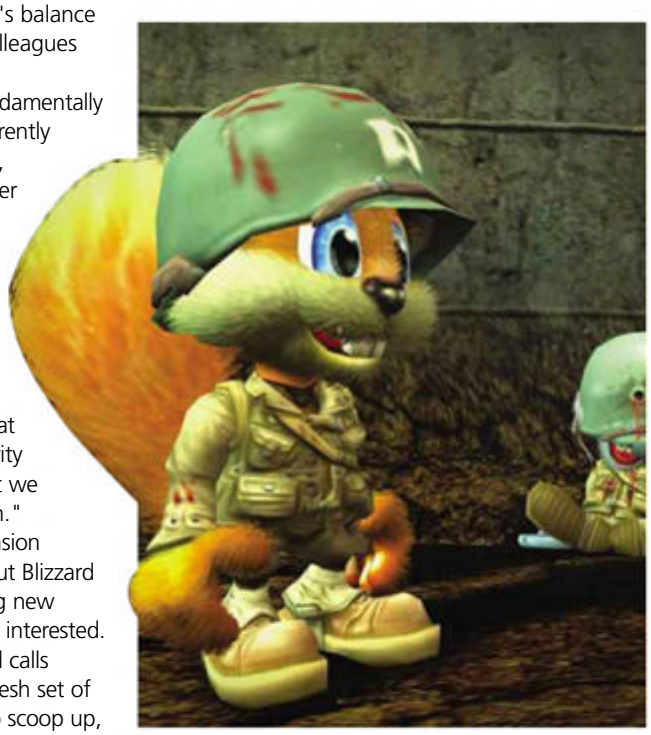
Incoming

If you owned a Nintendo 64 about 14 years ago, then you may remember *Conker's Bad Fur Day*. A 3D platformer from Rare, it starred a decidedly foul-mouthed, drunken squirrel, and quickly became something of a cult hit. While Rare doesn't seem to be in much of a hurry to revive *Conker*, US studio Team has taken the initiative. It's announced *Conker's Big Reunion* – an episodic series of adventures for its Project Spark game-making platform. While it isn't quite the fully fledged sequel *Conker* fans might want, it's still receiving some creative input from personnel at Rare, and voice actor Chris Seaver's even returning to voice the sweary squirrel.

In other Rare-related news, a group of design veterans from the studio have formed their own break-away team, Playtonic, and they're working on a spiritual successor to another game from Rare's back catalogue: *Banjo Kazooie*. Currently being developed under the working title *Project Ukulele*, the 3D platformer will be "between the size of *Banjo Kazooie* and *Banjo-Tooie*" according to the studio's recent interview with *Eurogamer*.

Project Ukulele will appear on Kickstarter sometime in May, and Playtonic has said that a figure of around £400,000 could be enough to get the game made. It's early days for *Project Ukulele*, obviously, but the work-in-progress has already received a positive response from players of the original *Banjo Kazooie*.

Conker's Big Reunion will appear on the 23rd April, and you can follow Playtonic's progress on Project Ukulele at **www.playtonicgames.com**.



Conker the boozy N64 squirrel's to make an unexpected appearance in Project Spark. The episodic series Conker's Big Reunion will be available on the 23rd April

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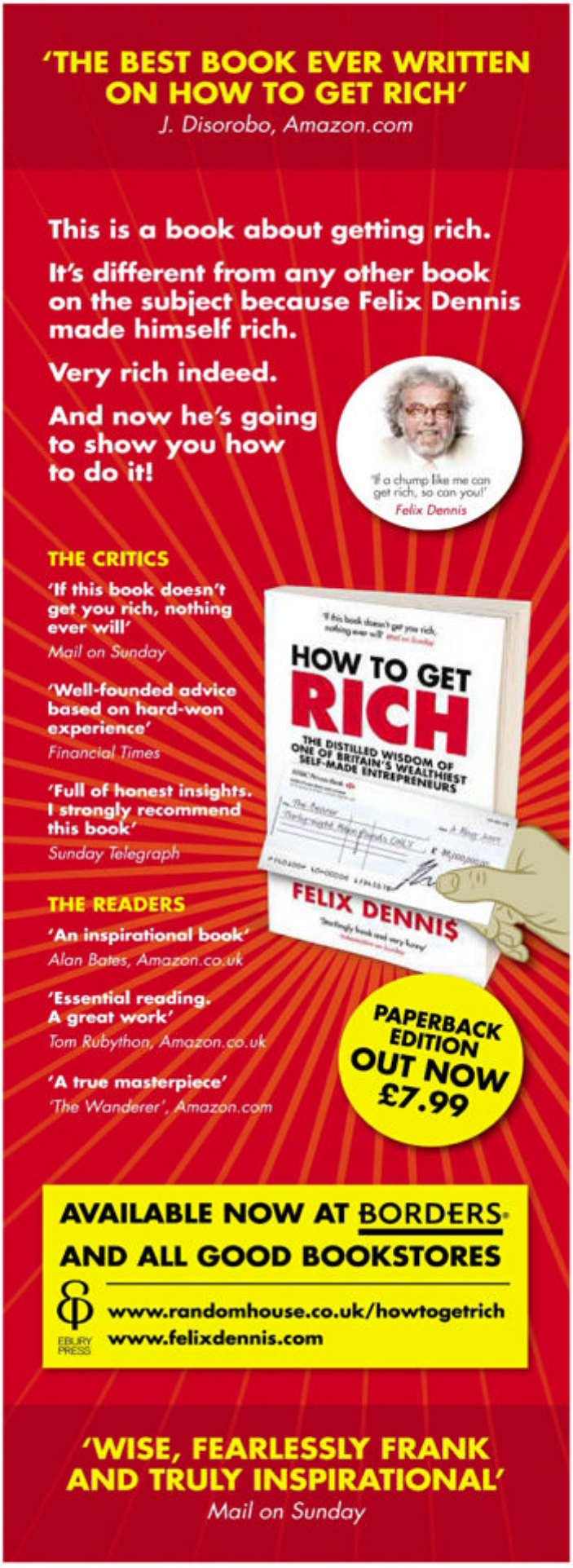

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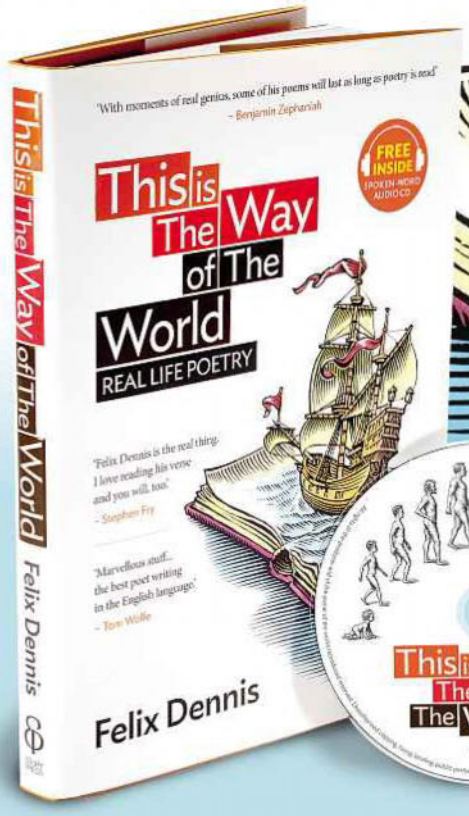

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Aaron

Best Backup

I use Easeus backup software but, following your Paragon walkthroughs, I downloaded it and did a full system backup using both programs, on the same day. I was very surprised to see that on my desktop, the Easeus backup was 163GB but the Paragon one was only 80GB. I ran them both again, on my laptop this time, and there was again a marked difference, though smaller: Easeus 80GB, Paragon 60GB.

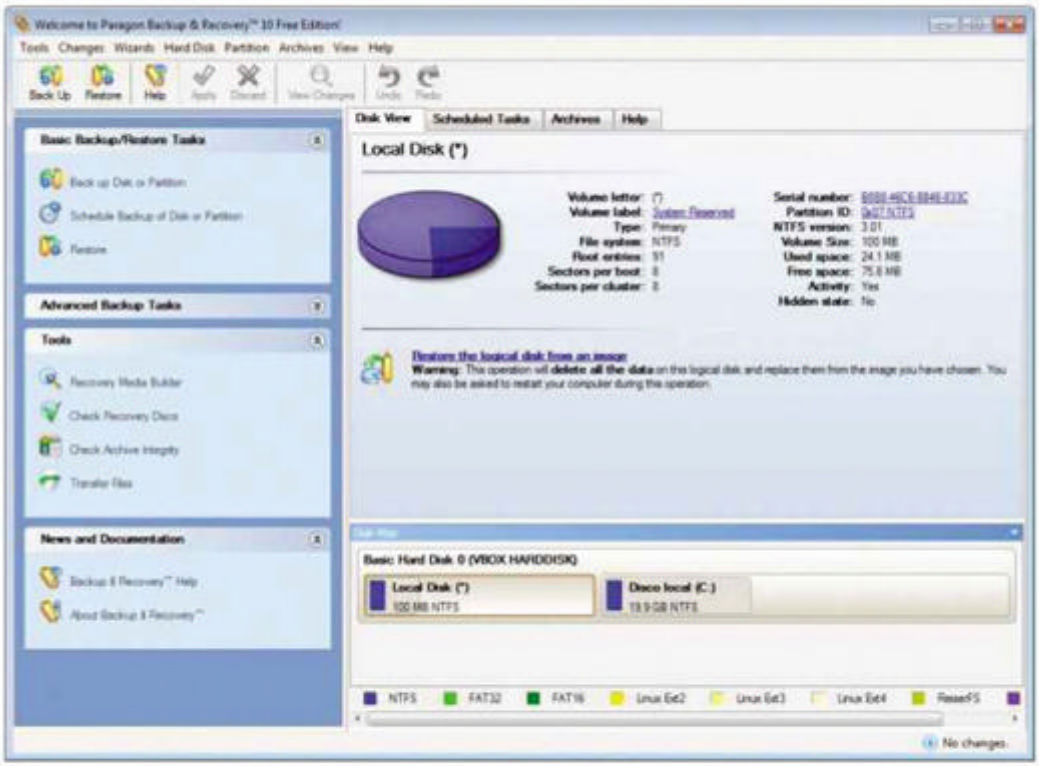
What causes the difference? Is it due to methods of compression, and if so which should I trust more?

Rick

The difference here is, as you note, most likely down to the method of compression each program uses, and Paragon's is simply more effective, producing smaller archive files. This doesn't make the program any less trustworthy, so I wouldn't worry about it too much.

If you're concerned, just make sure you always try to access the backup after you make it, just to make sure everything is okay. As long as you're able to access your archived data with no problems, everything should be fine, and it's just down to which software you prefer.

Paragon Backup & Recovery is a free and powerful tool that can compress archived data to save disk space



Size Matters

I recently built a new and very small media PC (ITX) for the kitchen/dining room using the AMD Athlon 5350 2.05HGHz quad-core with AMD Radeon R3 graphics on board and was absolutely blown away by its performance. I'm not suggesting for one minute this PC would be capable of playing any of the games I like to play on my main PC, however it outperformed my original, much larger and supposedly much more powerful media PC even with its GT430 graphics card on board.

What impressed me further is the fact that this new PC runs at around 25 watts under full load, whereas my original media PC is using around 115 watts! So clearly time for a change of components, but there's one problem: in my original media PC I use a Black Gold Dual DVB T/T2 TV tuner card that has a full length PCI connection, but every motherboard I have looked at thus far does not. They do, bizarrely, have a graphics card slot, which seems like a strange inclusion as the point of opting for the AM1 APU was its low power and on-board graphics, which make them ideal for a media centre. So the inclusion of a graphics card slot but no full length PCI slot just doesn't make sense to me. I would like to shrink my media PC down to as smaller footprint as I can, and would also like to reuse my existing TV card. So any suggestions would be gratefully received, but please keep in mind that I have fallen in love with these very low power APUs for non-gaming PCs.

One last thing, I am going to turn my attention to my gaming systems next, with electrical efficiency and graphical performance being the main considerations for what I eventually purchase and wondered why I can see TDPs for processors (and APUs) in every technical

section of every site I look at, but when it comes to graphics cards there is absolutely nothing. Is this a segment of the industry that is afraid to let us know how power hungry there products are? It makes it very difficult for me (the average consumer) to make an informed decision on a component that is probably going to cost me more than its initial purchase price, in electricity usage through the course of its life, and as I am the one paying for both I would be able to get the balance right. Do you know of an online resource for this sort of information?

Scott

ITX systems are designed to save space and in many instances to be low power, saving energy for the user. As you've found, they can offer a drastic drop in power consumption and are perfect for multimedia uses, but this can come at a cost, and some hardware options are lost in the process, including simple, often standard inclusions like PCI cards. This does make for less power consumption, but it can make the uses of a system less flexible.

Luckily, there are ways around it, without the need to sacrifice an older PCI card you'd rather keep. Perhaps the best option here, aside from shopping around for an alternative motherboard, would be to use a PCIe to PCI adapter. These clever devices let you connect a standard, non-low profile PCI card to a PCIe expansion slot, thus keeping your older hardware in action.

You can find these online from various vendors, and they're easy enough to install. Simply slot them into the PCIe expansion slot, slap in your Black Gold DVB card, and then connect the power. This should work fine, as long as the physical setup fits within your PC chassis.

If you look around further, you can even find external PCI card enclosures. Mainly designed as an aid to greater expansion, or for laptops that lack standard PCI slots, these can also be useful, although they will, of course, be a greater drain on power.

When it comes to graphics card power usage, these are always among the most power-hungry of components, and it's often not easy to find out how much power a card will use. There are good sites you can check out that can help, such as ***www.tomshardware.com*** *and* ***www.guru3d.com****. These often provide power consumption listings, which can help you find out what the more power hungry cards are. Website Geeks3D also has a long listing of GPU TDP ratings (****tinyurl.com/ntc9yw****). This is relatively up to date (last updated on September 9th, 2014), but some newer cards may be missing. There's still a good deal of information here, though, and it's easy to find the TDP measurement for each model.*

Needless to day, the higher-end cards, and SLI setups use far more energy than the lower-end models. When it comes to gaming, it's just harder to save power due to the need for sheer muscle, so some concessions need to be made and power saved elsewhere.

➤ PCIe to PCI adapters allow the use of PCI card, even when there's no standard PCI slot

➤ External PCI enclosures are a possible option, although they can be hard to find

➤ Powerful cards like Nvidia's Titans use a lot of power, there's no real way around this

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Jason

Pieces Of Eight

I'll soon be building a new PC. I notice that many PCs these days have 16GB of RAM, which seems a lot to me. I'm not what I'd call a power user – no Photoshop or anything – so could I get away with 8GB? This would save £50, which I could then spend on a bigger SSD or a better monitor. Or would 'only' 8GB lead to performance issues?

James, Outlook.com

You don't need 16GB, James. Photoshop gobbles as much RAM as you can feed it, but you're not running Photoshop. Even if you were, 8GB or even 4GB would be sufficient for casual use.

Tests show that for general desktop work, the benefits of 8GB over 4GB are minimal. Have a butcher's at this little article at PC & Tech Authority: ***bit.do/2PSS****. Across the board, 8GB yields only a 3% performance boost – hardly worthy of News at Ten. Even 2GB seems to be good enough (all this is on Windows 8.1).*

Of course, multi-tasking is a big RAM muncher. Most people have a setup comprising merely the likes of Word, a music player, and two or three browser tabs, but if you're a 25-tabs sort of person, with maybe a dozen other apps chugging away, I'd recommend 8GB for comfort. I'm a 25-tabs sort of person myself, and my 4GB laptop often slows to a crawl. According to Task Manager, Facebook often grabs 2GB of RAM all to itself. This is a memory leak – a bug in either Facebook or Chrome – but even so.

Are you a gamer, James? Watch this YouTube video showing side-by-side footage of Call of Duty: Advanced Warfare running on 4GB and 8GB: ***bit.do/2QmJ****. With 8GB, the game's as smooth as a Mr. Whippy ice-cream, but with 4GB, it's unplayable. I've not witnessed choppiness like that since I was a nipper on a ferry sailing from Portsmouth to Cherbourg. It's clear that 8GB of RAM is becoming essential for gaming.*

The upshot is this: fit 8GB and worry not. By the time 16GB becomes necessary, your PC will probably have been handed down to a niece or nephew for playing back episodes of Peppa Pig. Or else it'll be in landfill.

Can you ever have too much RAM?

In The Frame

Are tower systems back in fashion again? Here's another self-builder writing out a shopping list...

It's been some years since I last built a new PC but I'm back in the game after winning a few hundred quid on a scratchcard. It'll be a mid-range gaming setup, and I'll be fitting an SSD as the boot drive (with a spinner for data). Will I need an adaptor for this? I'm a bit out of the loop, but from the looks of things, SSDs are 2.5" devices and cases still come with only 3.5" and 5.25" bays. Also, the SSD I've got my eye on, the 240GB Kingston SSDNow V300 (is this any good?), is only 7mm thick, but it seems many other SSDs are 9.5mm thick. Is this likely to cause me installation difficulties?

S. Hunt, Gmail

*Yes, you'll probably need an adaptor. This is just a simple frame that has mounting points for a 2.5" device and which screws snugly into a 3.5" bay. You might *not* need one, though. Some high-end cases now have 2.5" bays right out of the box, whilst others come with adaptors included. However, most mainstream cases, those costing £20 or so (and there are some very good £20 cases), typically have just 5.25" bays (for optical drives) and 3.5" bays (for spinners).*

SSDs are sometimes sold in 'retail kits', where you get the SSD and also an adaptor and some migration software. Such kits tend to add £10 to the price, but a decent adaptor by itself needn't cost more than a fiver. Here's the link to the one I regularly use myself: ***bit.do/2P8V****. A kit makes good sense, of course, if you want to simplify the buying process or really are going to use the migration software (there are plenty of free alternatives).*

Don't worry about your SSD's height. As you say, SSDs traditionally have a height of 9.5mm, following the trend set by laptop HDDs, but recent models often have a height of 7mm, making them ideal for Ultrabooks and the like. Your concern is probably that the screw holes on the sides of the SSD won't line up with the screw holes on the sides of the adaptor, but an SSD actually screws into an adaptor from underneath (using industry-

standard mounting positions). Hole alignment on the sides is irrelevant.

Is the Kingston SSDNow V300 any good? In short: yes. It's not from the top-drawer – that would be Samsung's 850 Pro and its ilk – but unless you're an enthusiast drooling over fractions of a percent in benchmarks, it's terrific, even for gamers and other heavy-hitters. I've seen the 240GB model on sale recently for under £60 – it's usually about £72 – and for that money it's a steal. Also, a 240GB SSD is big enough that lighter users can completely forgo the installation of a separate spinner for data.

➤ SSDs have reached the point where the typical performance difference between budget drives and premium drives is negligible

Finding The Key

My laptop's hard drive packed up last week. I've fitted a new one and have also taken the opportunity to upgrade from Vista to Windows 7. I bought a 'refurbished' product key off eBay – it came with a Dell setup disc, which worked, even though my laptop's a Toshiba – but when I entered this, it was rejected. I skipped ahead and got Windows installed anyway, but I now only have two weeks left before I need to activate.

The seller assures me the key's genuine (and I've got the sticker), and it's true he's sold hundreds of them and has excellent feedback. He says I should ring Microsoft and get the key activated that way, but I can't say I'm too happy doing that. What if the key's dodgy? I'd be grateful for your advice.

Ray Hooper, Cornwall

You do have to be careful when buying an OS on eBay. There are many fakes being hawked. However, the fakes are typically new, sealed packs, not reclaimed product-key stickers with Dell installation discs. Such stickers are usually from towers and laptops that have since been 'decommissioned' (which could mean anything) – often machines that were beyond economical repair.

As you've clearly discovered, Ray, there are genuine savings to be had when buying Windows this way (and so long as the seller's followed the rules, it's just about legal). Windows 7 Professional can be bagged for £30 – about 25% of the 'proper' cost. Windows 8.1 'Core' goes for about £45, and XP and Vista – heaven help us – go for between £5 and £10.

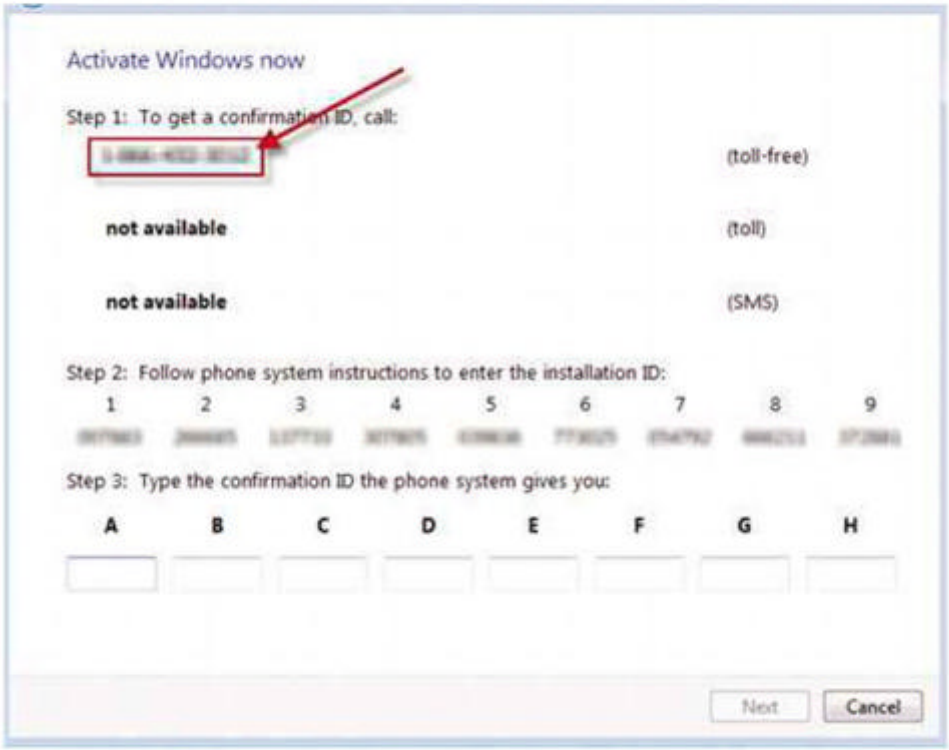
But why wasn't your key accepted? Most likely it was issued prior to the release of SP1 and most likely the disc you used had SP1 integrated. As odd as it sounds, that can make a difference. A similar problem can occur when trying to use a post-SP1 key with a pre-SP1 disc.

You did the right thing by skipping ahead and installing the OS regardless. You now need to apply your key 'after the fact'. This can be done by clicking the 'Change product key' link in the System dialogue – the easiest way to get there is to click Start, right-click Computer, and select Properties.

Quite often, though, that link doesn't exist (I've no idea why). If that's the case, do this: click Start, click All Programs, expand the Accessories folder, right-click Command Prompt, and select 'Run as administrator'. At the prompt, type the following (press Enter at the end and ignore the quotes): 'slmgr.vbs -ipk xxxxx-xxxxx-xxxxx-xxxxx-xxxxx'. Replace all the 'x' characters with your product key.

Automatic activation will probably fail, but that's nothing to worry about. As the seller suggested, choose the option to phone Microsoft. Dial the number on the screen (it's free). You've nothing to fear. You're not guilty of anything, and in any case the system's totally automated. On the screen you should see nine groups of five numbers – groups 1 to 9. Once you've entered these on the phone's keypad you'll be given a confirmation ID comprising a further eight groups of five numbers – groups A to H. Enter these on the screen. And that's it, Ray. Job done. With a valid key – and I'm sure yours is – I've never known this process to fail.

➤ Windows activation hassles can normally be overcome with a free call to a Microsoft robot



Crowdfunding Corner

The past meets the future with this week's crowdfunding projects: retro consoles and sci-fi inspired fingerprint scanning tech!

Mini Emu

Powered by the Raspberry Pi, this project will create a 40-system emulator that can be used to play thousands of games with support for external controllers and a custom OS. The hardware includes an 8GB mini SD card for storage, which comes pre-loaded with the software you need to get started. HDMI-out ensures full compatibility with all modern screens allowing you to enjoy retro games like never before.

Based on Kodi (formerly XBMC) and featuring a combination of Retropie and Emulation Station for managing your old systems, the Mini Emu also comes with a variety of shareware and freeware games, including *Quake*, *Duke Nukem 3D* and *Doom*. Essentially it's a mini PC, so you can customise it further if you wish or leave it how it is. A 32GB version also uses a Raspberry Pi 2 for even more power.

As a Pi project, backing it involves different levels of personal input into the final product. For €25 (£18) you can get a download of the software package alone to put in your own Pi-based system. For €99 (£73) you can get the 8GB basic console with a controller, pre-loaded SD card and power/HDMI cables. For €169 (£123) you get the 32GB console with keyring and t-shirt, and the chance to buy an extra controller for €10 (£7) more. The project has blown past its original target and delivery is currently planned for August 2015, and with over a month to go there's plenty of time to get on board.

URL: kck.st/1CQaFU2
Funding Ends: Wednesday, May 6th 2015

iTouch ID

If you've ever used the fingerprint scanner on a laptop, smartphone or tablet, you'll know that they're surprisingly quick and convenient. Unfortunately, there's no easy way to add the capability to an existing system – unless you use this Kickstarter, that is.

The scanner itself is built from laser-cut sapphire glass, aircraft grade aluminium and a capacitive fingerprint sensor with 500 pixels per inch resolution. It features high-security AES-256 encryption with a unique identifier per device for two level authentication – there's no chance of your fingerprint being intercepted or cloned even if the device is stolen.

The built-in software allows you to use the fingerprint sensor to log into accounts without the need for a password, and it's compatible with both PC and Mac hardware. Your actual fingerprint is never stored, only the analysis of it, so thieving the material is almost impossible. It can manage multiple accounts and be used to lock and unlock files and programs on your local system too.

Although the early-bird tiers have all been filled, the project still has a long way to go at time of writing, but it's heading there fast. Backers can get a gold, silver, black or limited-edition Kickstarter-green iTouch for NZ$130 (£66) with other colours and engravings available at higher prices. Let's face it, though, any amount is worth not having to type a password in again. Just make sure you don't lose your hand in an accident and you'll be fine.

URL: kck.st/1xrVzC5
Funding Ends: Saturday, April 18th 2015

Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Deadbolt

David Hayward likes free PC games

We like free stuff. Cakes, doughnuts, coffee and, of course, games – especially games combined with all of the above.

Recently, we were on the lookout for something a little different and free, when we came across an amazing little title called *Deadbolt*, from Hopoo Games. This is a wonderfully tactical but extremely violent two-dimensional, 8-bit-looking adventure shooter.

The Talking Fireplace

The game has you as a brown trenchcoat-wearing individual, whose task it is to rid the world of the zombie king and his undead henchmen, who inhabit a number of multi-storey apartments.

You start off the first level by following the on-screen instructions and quickly work out how to slay your first zombie with a kitchen knife. After the level is complete, you'll return to your own home and sit in front of a roaring fire. This is where things start to get a little weird.

The flame starts a conversation with you, detailing how it gives the fire of life to humans, and when they die the spark returns to the source fire. However, modern ways of dying, which include drug overdoses, lead to the spark remaining in the person and them becoming undead. The fire wants that spark back, and it wants you to eliminate the undead and rid the world of a special kind of drug that's keeping the spark from returning to the fire.

To do so you'll have a selection of weaponry, from kitchen knives you can stab with or throw, through to various types of guns. Each new level tasks you with wiping out all the enemies and something extra, like finding intel on the drugs and whereabouts of the zombie king or setting fire to and destroying drug caches.

Each level is made up of a series of floors, separated by doors. You can sneak around and open doors, but doing so will alert the similarly armed zombies, who will shoot you dead. Therefore you'll need some nifty tactics to get past zombies and take them out individually, without running out of ammunition.

There are, throughout the levels, drains and air vents that your chap can use to crawl through to access different parts of the complex. When you reach an opening, you can hop out and kill off any zombies in the room, then hop back in before the rest rush to the scene of the disturbance.

Features At A Glance

- Free!
- Interesting tactics and learning curve.
- Very bloody and violent – be warned.
- Odd but compelling storyline.

Other tactics include waiting for zombies to use the toilet, which you can run up through the drains and surprise them when they least expect it, which is a little unsporting. You can also create diversions by knocking on doors, turning off lights and using the furniture throughout as cover.

Conclusion

We have to say that while this is a great little game, it is extremely visceral. If you don't have a problem with body parts being brutally removed and blood soaked rooms of ultra-violence, then *Deadbolt* will provide you with some interesting moments.

It's a fantastic little game – exceedingly addictive and very enjoyable. If you get a moment, download it from **hopoo.itch.io/deadbolt** and enjoy. **mm**

You choose the weapon and commence zombie cleanup

Your home, where the fire talks to you and sets missions

Yes, it's very brutal

Logging Off

I've joked numerous times about how with more than 128,000 employees, Microsoft should have at least one that can communicate effectively. But it appears not.

One of those who certainly can't is Microsoft executive vice president, Terry Myerson, who did a telephone interview with Reuters on March 18th, during which he gave the distinct impression that pirated copies of Windows 7 and 8 would be upgraded to Windows 10.

Here is what he said: "We are upgrading all qualified PCs, genuine and non-genuine, to Windows 10," And, Microsoft will be; he got that bit right. However, what he critically failed to mention was that after unlicensed versions were upgraded, they wouldn't be licensed copies, just Windows 10 waiting to be activated with a valid code.

That would be classified as 'no news' in my book, as it's a situation that remains unchanged from the precise scenario today.

Before he'd even put the phone down, the stories about how Microsoft was offering the pirates an olive branch were circulating the globe like a public relations pandemic.

The truth took another 24 hours to come along, at which point Microsoft looked pretty stupid for giving the wholly wrong impression.

Of course, news distributors can often run with a story that they haven't confirmed or they can even intentionally introduce some creative re-interpretation. But even Reuters ran with 'Microsoft tackles China piracy with free upgrade to Windows 10' as its headline, so that wasn't the case here.

What didn't help was that Myerson said that Microsoft's plan was to "re-engage" with the hundreds of millions of users of Windows in China. Which begs the obvious question: how does offering all those Windows users, who are running mostly pirated copies in that geographic location, absolutely nothing somehow re-engage them?

Given that in the same interview Myerson claimed Windows 10 would be released this 'summer', should we carefully reinterpret that as summer in 'Australia' (our winter) or not this coming summer but some subsequent one?

The problem here, and it's a trap that big tech companies have fallen into on numerous occasions, is that they give lots of people the tag of 'vice president' and then assume they're astute enough to open their mouths in public.

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When you consider the hole that Microsoft CEO Satya Nadella dug himself about women's pay, you'd think they'd be working to a preprepared script and not just opening their mouths while their brains are engaged elsewhere.

What I've been telling people up to this point, and will continue to do so, is that if you'd like a cheap version of Windows 10, then probably the best way to get it is to install an OEM version of Windows 7. You can pick these up rather cheaply, and although you can't move them from one PC to another, they can be used to get the free upgrade (unless that info was misinterpreted too!) when it comes.

In retrospect, the notion that Microsoft would embrace software pirates does seem unrealistic. Yet it would have helped remove Windows 7 more smartly than the very ineffective methods that it employed to shift Windows XP.

In the meantime, Microsoft needs to tell its VPs that their primary role is spread positive stories about the company that are mostly fact based, and not generate easily misinterpreted soundbites off the cuff.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: **7** Digg, **3** Copyleft, **9** Charset, **10** Gross, **11** Polarography, **13** E-Waste, **15** Stocks, **17** Microfinance, **20** Radii, **21** Wrapper, **22** Energise, **23** Plus.
Down: **1** Decipher, **2** Grail, **4** Outage, **5** Yagi Antennas, **6** Eco-Chic, **7** Task, **8** Astroturfing, **12** MS Hearts, **14** Ariadne, **16** A Few Z's, **18** Nepal, **19** Free.

THIS WEEK'S CROSSWORD

Across

1 Priestess of Aphrodite who killed herself when her lover Leander drowned while trying to swim the Hellespont to see her. (4)
3 Put into long-term storage with a view to future use. (8)
9 Anything of no direct medical benefit, which nevertheless makes people feel better or benefit psychologically. (7)
10 Public meetings or marches protesting against something or expressing views on political issues. (Abbr) (5)
11 Changes designed to improve software functionality. (12)
13 A common enharmonic equivalent of F, but is not regarded as the same note. (1-5)
15 A multiple†star with six components; second brightest in Gemini; close to Pollux. (6)
17 A type of aptitude test using the theory and techniques of psychological measurement. (12)
20 A data storage system used to store information in sequential logic systems. (5)
21 Constructed with standardised units or dimensions allowing flexibility and variety in use. (7)
22 Arrange the sequence of numbers assigned to pages in a book or document. (8)
23 More politely referred to as a Windows stop error! (Abbr) (4)

Down

1 Came into being; became reality. (8)
2 Measure of online success in influencing or having an effect on. (5)
4 A belt of the earth's crust involved in the formation of mountains. (6)
5 A secret or ulterior motive for doing something. (6,6)
6 Just own up please – you broke it didn't you? (5,2)
7 A curated set of Twitter accounts that you can group together in their own timeline. (4)
8 This world famous Canadian singer's song 'Hallelujah' was used on the soundtrack of *Shrek*, in a version by Rufus Wainwright. (7,5)
12 RGB: 150,25,14 (5,3)
14 In social media a word or phrase preceded by the '#' sign. (7)
16 A defined structure for the processing, storage or display of data. (6)
18 Principles or conditions that govern behaviour. (5)
19 An unexpected, minor and typically temporary deviation from a general trend. (4)

DISCLAIMER
The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Rather than ending on a bombshell, let's begin with one. Yes, we are, of course, referring to the controversial sacking of TV presenter Jeremy Clarkson, which was obviously the most important thing to have happened this week – nay, this whole year. No, nothing in the world matters more than protecting the job of a man who was dismissed for getting boozed up and smacking one of his colleagues in the face. What's wrong with that anyway? What workplace couldn't be livened up with a bit more wreckless violence? Surely we've all sat in the office on a rainy Wednesday afternoon and thought, "You know what? I could really go for a bit of a fist fight about now." And who could blame you? They are very moreish, after all. To that end, every second Friday of the month in the MM office will now be Punch-up Day, where it will be mandatory for all employees to scream abuse at each other and let out all their frustrations with a little pugilistic rage. So basically the same as every other day...

In Next Week's Micro Mart*

- What are interruptible power supplies and why might you want one?
- How to remove unwanted add-ons from your web browser
- How to hook up a Spectrum to a modern monitor
- The £60 mobile challenge. How much can you get for your money?
- Plus the usual mix of news, reviews and advice

* May be subject to change

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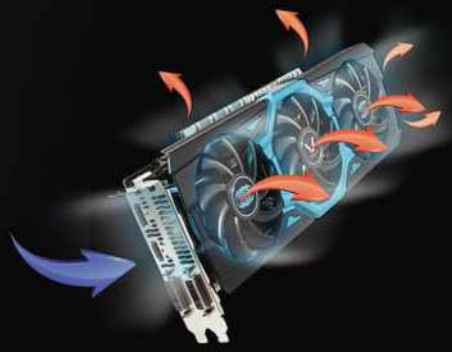

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